The chemical and pharmaceutical trading activities of the Society of Apothecaries, 1822 to 1922

Thesis

The Chemical and Pharmaceutical Trading Activities of the Society of Apothecaries, 1822 to 1922

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For Paul and my parents, for the endless support they have shown me.

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Abbreviations

AHA - Apothecaries' Hall Archive

BJHS - British Journal for the History of Science

CM - Court of Assistants Minutes

DNB - Dictionary of National Biography

DSB - Dictionary of Scientific Biography

FIC - Fellow of the Institute of Chemistry

FCS - Fellow of the Chemical Society

GCM - General Court of Managers

GCP - General Court of Proprietors

JCS - Journal of the Chemical Society

MCM - Management Committee Minutes

OIOC - Oriental and India Office Collection

PHIBB - P.J. Wallis and R.V. Wallis, *Eighteenth Century Medics: Subscriptions, Licences, Apprenticeships* (Newcastle-upon-Tyne, 1988).

PC - Private Court

PRO - Public Record Office

PRS - *Proceedings of the Royal Society*

QJS - Quarterly Journal of Science

SCA - Special Court of Assistants

SCME - Select Committee on Medical Education

SPA - Society of Public Analysts

SPC - Special Private Court

USAB - United Stock Account Books

Dates are given according to the modern (post-1752) calendar.

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Introduction

The Society of Apothecaries is usually studied in terms of its current functions as a livery company and medical licensing authority. However, there was a significant third strand to its activities from 1672 to 1922 - the pharmaceutical trade - which interacted in important ways with the Society's other two functions. In 1672 a laboratory was founded at Apothecaries' Hall, Blackfriars and a chemical operator was appointed to manufacture chemical medicines. This was one of the earliest establishments in England for producing drugs on a large scale. From these beginnings a pharmaceutical trade supplying the armed forces, colonies, medical practitioners and hospitals developed. In the eighteenth century the trade was administered by the two stock companies operating at the Hall, to which the Society's members subscribed money. These were called the Laboratory Stock and the Navy Stock. They were amalgamated in 1822 to form the United Stock and it is in this crucial year that my analysis of the chemical and pharmaceutical trading activities of the Society of Apothecaries begins.

The work of the laboratories and the activities of the pharmaceutical trade at Apothecaries' Hall have been inadequately served by historians. Although in their histories of the Society both E.A. Underwood and Penelope Hunting devote a chapter to the Hall trade, their focus lies mostly on its establishment and successful years.[1] These, along with the Society's

[1] E.A. Underwood (ed.), Cecil Wall and H.C. Cameron, *A History of the Worshipful Society of Apothecaries of London, vol. 1, 1617-1815* (London, 1963) (hereafter cited as Underwood), pp. 148-61; Penelope Hunting, *A History of the Society of Apothecaries* (London, 1998), pp. 153-91.

other institutional histories,[2] are generally narrative in style and present the organisation in a favourable light. A few short histories from the nineteenth and early-twentieth centuries also exist. These were written to promote a certain aspect of the Society when it was faced with difficulties. For example, when its licensing powers were under threat, the Society's contribution to medical practice was highlighted, whilst another history attempted to boost the status of the medical practitioners who had qualified through the Society's licence.[3]

The Hall trade is generally mentioned in all of the broad surveys of the history of pharmacy in Britain, although only briefly.[4] This is because the traditional depiction of development in the pharmaceutical industry is that of a chemist and druggist expanding manufacturing capabilities and moving into the wholesale trade.[5] Alongside this analysis the Hall trade is only noted as somewhat of a curiosity. Although J.K. Crellin drew attention in 1967 to how the "full story of the nineteenth century reputation and influence of the Society's manufacturing activities has not yet been told", no in depth study has been undertaken.[6] This omission reflects the general neglect of the history of pharmacy as a

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[2] C.R.B. Barrett, *The History of the Society of Apothecaries of London* (London, 1905); Cecil Wall, *The London Apothecaries: their Society and their Hall* (London, 1932); W.S.C. Copeman, *The Worshipful Society of Apothecaries of London: A History 1617-1967* (London, 1967).

[3] George Corfe, *The Apothecary, ancient and modern, of the City of London* (London, 1885); Percy G. Lodge, *A Short History of the Society of Apothecaries of London* (London, 1901).

[4] J. Bell and T. Redwood, *Historical Sketch of the Progress of Pharmacy in Britain* (London, 1880), pp. 13, 81-4; Leslie Matthews, *History of Pharmacy in Britain* (Edinburgh, 1962), pp. 117, 190-1; G.E. Trease, *Pharmacy in History* (London, 1964), p. 142, p. 156; Juanita Burnby, "The Early Years of the Pharmaceutical Industry", in Lesley Richmond, Julie Stevenson and Alison Turton (eds.), *The Pharmaceutical Industry: a guide to historical records* (Aldershot, 2003), pp. 1-13.

[5] George Urdang, "Retail Pharmacy as the Nucleus of the Pharmaceutical Industry", *Bulletin of the History of Medicine,* Supplement no. 3, 1944, pp. 325-46; Burnby, 2003.

[6] J.K. Crellin, "The Growth of Professionalism in Nineteenth Century British Pharmacy", *Medical History,* **11** (1967), pp. 215-27, quote from pp. 215-16. One short article on the trade exists: J.C. O'Leary, "The

whole in recent times, as emphasised by Roy Porter and Dorothy Porter.[7] However there are exceptions to this, such as the various company histories that have been published.[8] Additionally, the supposed absence of research and development in the industry prior to the First World War has resulted in the late-nineteenth and early-twentieth centuries receiving further attention, notably from Jonathan Liebenau.[9]

Research by Jonathan Liebenau and Michael Robson has led to a fourfold categorization of firms in the British pharmaceutical industry at the turn of the twentieth century. Firstly, there are the archetypal English firms, such as Allen and Hanburys and Howards and Sons, which dealt mostly in the import and processing of natural products or basic chemicals. The second category covers the Edinburgh alkaloid firms, for example J.F. Macfarlan and Co. and T. and H. Smith, which, in addition to their alkaloid work, manufactured chloroform and ether. Next there are the retail and marketing companies, such as Boots of

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Elaboratory and Stocks of the Society of Apothecaries", *Pharmaceutical Historian,* **27** no.2 (1997), pp. 14-20.

[7] Roy Porter and Dorothy Porter, "The Rise of the English Drugs Industry: The Role of Thomas Corbyn", *Medical History,* **33** (1989), pp. 277-95.

[8] For example Judy Slinn, *A History of May and Baker, 1834-1984* (Cambridge, 1984); Geoffrey Tweedale, *At the Sign of the Plough: Allen and Hanburys and the British Pharmaceutical Industry, 1715-1990* (London, 1990).

[9] Jonathan Liebenau, "Industrial Research and Development in Pharmaceutical Firms in the Early Twentieth Century", *Business History*, **26** (1984), pp. 329-46; Jonathan Liebenau, "Ethical Business: The Formation of the Pharmaceutical Industry in Britain, Germany, and the United States before 1914", *Business History,* **30** (1988), pp. 116-29; Michael Robson, "The British Pharmaceutical Industry and the First World War", in Jonathan Liebenau (ed.), *The Challenge of New Technology: Innovation in British Business since 1850* (Aldershot, 1988), pp. 83-105; Jonathan Liebenau, "The Rise of the British Pharmaceutical Industry", *BMJ,* **301** (1990), pp. 724-8; Judy Slinn, "Research and Development in the UK Pharmaceutical Industry from the nineteenth century to the 1960s", in Mikuláš Teich and Roy Porter (eds.), *Drugs and Narcotics in History* (Cambridge, 1995), pp. 168-86.

Nottingham, which were developing multi-outlet chains and discounting products. Finally there are the firms such as Burroughs Wellcome and Co., which possessed a company sponsored research laboratory.[10]

My thesis demonstrates that the Hall trade does not fall within this analysis. The Society is a unique and complex institution, whose trading activities were shaped by its other two functions. Studying the Hall trade during the last one hundred years of its existence illuminates interactions between the evolving practices of chemistry, pharmacy and medicine and provides wider insights into institutional dynamics and the British pharmaceutical industry. The Society was in a category of its own in the pharmaceutical industry, that of a quasi-commercial trading body administered under the auspices of a livery company. Following on from its role as a guarantor of drug quality laid down in its founding charter, the Society undertook the manufacture of chemical medicines at Apothecaries' Hall to ensure that high-quality drugs were available. Thereafter, due to the demand for the Society's drugs, a lucrative trading concern developed. This was very different from the development of the rest of the British pharmaceutical industry, indicating how the industry's evolution was more complex than has often been portrayed.

This thesis looks at the Hall trade during the significant years 1822 to 1922. Beginning with the formation of the United Stock, this period saw various alterations to the Hall's trading activities as the Society responded to external events. The trade was increasingly constrained by the Society's tripartite nature and the legacy of past business practices, whilst the pharmaceutical marketplace within which it operated was changing. By treating the trade's activities chronologically, the impact of the Society's attempts to continue its role as a guarantor of drug quality can be evaluated. The Society's trading activities from 1822 until the trade's closure in 1922 can be split into two parts around the year 1880,

[10] Liebenau, 1984; Robson, 1988. References to individual firms will be given in subsequent chapters.

when the United Stock was dissolved. After this year the Hall trade was directly administered by the Society, which shifted the emphasis of its activities and underlined its unusual position in the pharmaceutical trade.

That the Hall trade developed in a distinct way from other British pharmaceutical firms was a consequence of its tripartite functions and complexity as an institution. When the Society was founded in the seventeenth century, its activities overseeing the work of the apothecary and producing and selling drugs as a livery company were rationally integrated as an expression of the contemporary mix of the practices of chemistry, pharmacy and medicine. However, the Society retained this tradition throughout the Hall trade's existence, when these practices became differentiated in the nineteenth century.[11] Another implication of the trade's long history was the legacy of business methods developed in an earlier period. Even after the trade was restructured with the foundation of the United Stock in 1822, earlier practices persisted and this would be an ongoing problem.

Through studying the Hall pharmaceutical trade certain key issues become apparent. Although the Society's tripartite nature could be problematic when the interests of its different functions conflicted, it could also be beneficial. The Society's status as a medical corporation and livery company reinforced its reputation for the manufacture and supply of high-quality drugs and helped to foster relationships with government and public service customers. Combined with the Hall's gentlemanly approach to commerce and its public service ethos, this helped the trade to maintain a market of drug supply in the nineteenth century when faced with growing competition.

[11] Colin A. Russell, Noel G. Coley and Gerrylynn K. Roberts, *Chemists by Profession. The Origins and Rise of the Royal Institute of Chemistry* (Milton Keynes, 1977), chapters two and three.

The Society's reputation for the supply of high-quality drugs was rooted in the Hall laboratories. In addition to being the site of drug manufacture, they were the location for the applied research and consultancy work performed by the Hall's chemists. However, the significance of the Hall laboratories and chemists went beyond their uses for the Society's trading operation. The laboratories, in addition to their practical function for drug manufacturing, had an important rhetorical function for the Society. Being central to the Society's activities, the laboratories boosted its status in the pharmaceutical trade, as a medical licensing corporation and as an institution. Additionally, this analysis is relevant to wider issues in the study of both institutions and the pharmaceutical industry. An investigation of the Hall trade indicates how the laboratory can generate authority within a wider institutional context. Meanwhile, the prominence and extent of the Hall chemists' activities suggest an important role for the chemist in the development of the pharmaceutical industry and provide an example of the emerging professionalization of chemistry.

The achievements of the Hall chemists were a stark contrast to the lethargic and conservative manner in which the Society and its members managed the Hall trade. In addition to the outdated administrative and financial practices, there was an adherence to tradition and a general resistance to any change. By 1880, the Hall trade was manufacturing fewer drugs. Its function had shifted more towards wholesaling as it purchased many of the drugs that it sold from its competitors. Following the loss of important government customers, increasingly the trade's running costs were too large compared to its turnover and it struggled to break even. Meanwhile, the pharmaceutical marketplace was more competitive, as other firms expanded production, improved laboratory procedure and advertised widely. Although the Hall trade tried to adapt within the boundaries imposed by its tripartite nature, it remained rooted in past practices and the gulf between it and the rest of the British pharmaceutical industry grew.

The neglect by historians of the chemical and pharmaceutical trading activities of the Society of Apothecaries has not only resulted in a vital component of the development of the British pharmaceutical industry being overlooked, but also to the Society as a whole being misunderstood. In examining the Society's pharmaceutical and chemical activities from 1822 to 1922 a clear picture of the Society as an institution and as a location for pharmaceutical manufacturing emerges. A central aspect of the Society and its activities were the Hall laboratories, which provide a significant example of chemical practice in England. Meanwhile, the Society's tripartite nature, combined with the structural and functional legacy from the seventeenth and eighteenth centuries, shaped the Hall trade and tied it to tradition. Although the Society of Apothecaries may have been peculiar in nature, it is a crucial institution at the cusp of developments in medicine, pharmacy and chemistry, and its activities must be reassessed.

CHAPTER ONE

The Society of Apothecaries and its Pharmaceutical Trade, 1617-1822

The last one hundred years of the pharmaceutical and chemical trading activities of the Society of Apothecaries were strongly influenced by the Society's institutional structure and the format of the stock companies previously set up at the Hall. Whilst these had a rationale at the time of their introduction, this did not continue to apply, leaving a legacy that affected the way that the Society and its trade operated. Although the Society's activities in the seventeenth century reflected the contemporary mix of the practices medicine, pharmacy and chemistry, in the nineteenth century the boundaries that were evolving between these fields made the Society's activities increasingly ambiguous.

The Society's trading activities evolved from its 1617 charter. This laid down a role for the Society as a guarantor of drug quality, which subsequently developed into drug production at the Hall. The Hall laboratory was one of the first establishments for the large-scale manufacture of drugs in England and thus the Society has an important place in the development of the pharmaceutical industry in Britain. The Society's long history of drug manufacture had both positive and negative aspects for the Hall trade in the nineteenth century. Although the Society had obtained a reputation for the supply of high-quality drugs, its tripartite nature combined with the structural legacy of the eighteenth-century stock companies, resulted in the Hall trade being administered by business practices more suited to an earlier age. Thus it is essential to examine the Society's initial constitution and early trading activities to understand the Hall trade during the period 1822 to 1922.

The Foundation of the Society of Apothecaries

Although the corporate history of the apothecaries in London before 1617 was as members of the Grocers' Company,[1] following the granting of statutory authority to the College of Physicians in 1523, the physicians were increasingly involved in the apothecaries' affairs.[2] By the beginning of the seventeenth century, the absence of any representation on the Grocers' governing body led certain apothecaries to seek independence and the right to control their own trade. Underwood has provided a detailed description of the events surrounding the Society's formation, whilst Patrick Wallis has analysed the influence of the Court, the City of London and the College of Physicians.[3] For the purposes of this thesis, it is necessary to concentrate on two key points: the contents of the charter establishing the Society of Apothecaries and the identities and objectives of the various groups who sought to influence the apothecaries' fate.

The 1617 charter gave the Society a monopoly over the practice of pharmacy in the City of London and within a seven-mile radius. No apothecary could practise unless he had completed an eight-year apprenticeship and been examined by the Society, in consultation with the College of Physicians. The Society was also given the right to inspect apothecaries' shops, in conjunction with the College Censors, to maintain standards. To ensure the sale of reputable drugs, the Society could destroy any "unwholesome, corrupt, unmedicinable, pernicious or hurtful"[4] medicines that they encountered and charge fines as punishment. In directing the Society to uphold drug standards, the charter laid out a role

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[1] Pamela Nightingale, *A Medieval Mercantile Community. The Grocers' Company and the Politics and Trade of London 1000-1485* (Connecticut, 1995); Hunting, 1998, chapters one and two.

[2] Underwood, pp. 8-9.

[3] Underwood, chapter two; Patrick Wallis, "Medicines for London: the trade, regulation and lifecycle of London apothecaries c. 1610-1670", DPhil Thesis, Oxford University, 2002, chapter two.

[4] A transcript of the 1617 Charter is included in Barrett, quote from p. xxxiv.

for the Society as a guarantor of drug quality, something that would provide the rationale for its future trading activities.

The College of Physicians was instrumental in the Society's separation from the Grocers because it believed that the newly independent apothecaries would be subservient to it. Although later drafts of the charter reduced the College's supremacy,[5] the College clearly regarded the apothecaries as inferior, a sentiment that would dominate all subsequent relations. The case for the apothecaries' separation had been emphasised to the College of Physicians by Henry Atkins, who along with his fellow physician to the King, Theodore de Mayerne, and Gideon de Laune, apothecary to the Queen Consort, were instrumental in obtaining the Society's charter. Additionally, Mayerne and Atkin's involvement in compiling the first English *Pharmacopoeia* in 1618, combined with Mayerne's iatrochemical activities,[6] suggest an interest in drug manufacture and chemistry that was especially relevant to the apothecary.

Counteracting this support from Court and College was opposition from the City of London which, with the Grocers' Company, objected to the apothecaries' separation due to the precedent it created of fragmenting existing companies.[7] Even after its charter was granted, the position of the Society was far from secure. Disputes with the Grocers' Company about which goods fell within their respective monopolies escalated into a

[5] Underwood, pp. 19-20; George Clark, *A History of the Royal College of Physicians of London,* vol. 1 (Oxford, 1964), pp. 224-5; Juanita Burnby, *A Study of the English Apothecary from 1660 to 1760,* Medical History Supplement No. 3 (London, 1983), pp. 6-7.

[6] George Urdang, "The History of the Pharmacopoeia Londinenis", included in *Pharmacopoeia Londinensis of 1618,* Hollister Pharmaceutical Library No. 2 (Wisconsin, 1944), pp. 8-9; Allen Debus, *The English Paracelsians* (London, 1965), pp. 150-6.

[7] Underwood, pp. 10-17; Joseph P. Ward, *Metropolitan Communities: Trade Guilds, Identity and Change in Early Modern London* (Stanford, California, 1997), p. 101, pp. 117-20; Wallis, 2002, pp. 29-30.

contest in the Court of Star Chamber in 1622 and an issue between the House of Commons and King James I.[8] Meanwhile the City continued its opposition to the new company with the Court of Aldermen[9] reluctant to enrol the Society's charter until they were instructed to do so by the King.[10] This opposition, combined with the problematic question of precedence, led to a substantial delay in granting the Society a livery. When it finally occurred in 1630, the Society was disappointed by its low rank, being placed fifty-eighth out of eighty-four seventeenth-century livery companies.[11] The Society's creation had been greatly influenced by the City, Court, and College, institutions which would all be important in its future. Despite the threats to its existence, the Society had survived and when it came out of debt in 1631 it resumed its search for a Hall. Cobham House in Blackfriars, situated on the site of the Priory of the Black Friars, was purchased for use as a Hall in 1632, so the Society now had a base for its activities.[12]

The Structure of the Society of Apothecaries

In its 1617 charter the title "Society of Apothecaries" was used, even though the term "company" is usually found in most official seventeenth-century documents.[13] Although usage of "company" persisted, in the nineteenth century the apothecaries always used the word "society" to describe their organisation, a usage that will be followed in this thesis. The charter also laid down a structure for the Society, an explanation of which is essential for understanding the Hall pharmaceutical trade. The Society corporately had overall

[8] Underwood, pp. 35-40, 225-42.

[9] This is the City's upper court, consisting of twenty-five aldermen, elected by residents, certain business owners and tenants in each ward. I.G. Doolittle, *The City of London and its Livery Companies* (Dorchester, 1982).

[10] Underwood, pp. 23-4.

[11] Underwood, pp. 28-9; Hunting, 1998, p. 41.

[12] For the development of Apothecaries' Hall, see Hunting, 1998, pp. 75-112.

[13] Underwood, p. 19. The name "Worshipful Society of Apothecaries" is also used.

control of the trade and those holding positions of authority on the Court of Assistants (see below) were frequently influential in its activities. Furthermore, ownership of shares in the stock companies and participation in the trade's management were generally linked to a member's rank within the livery company.

The Society's rights are similar to other livery companies in the City of London, as it is able to hold meetings, own and assign property, make ordinances and possess a common seal. The categories of membership and structure of the Society remain the same today. On becoming a member of the Society, one becomes a freeman, who was later increasingly called the yeoman.[14] Freedom of a livery company can be achieved in three ways: servitude (a period of apprenticeship to a member of the company); patrimony (the right of entry of a child born to someone who is already a liveryman); or redemption (payment of a substantial sum of money). In the seventeenth century apprenticeship was the usual means of entry, but as livery companies' links with their trades diminished (see pp. 14-15), patrimony and redemption became the common paths to membership. A seventeenth-century freeman benefited from the trading privileges, social standing and benevolent assistance that a company's membership conferred, whilst he could apply to the Court of Aldermen for admission to the Freedom of the City of London, something that was essential for pursuing a trade there. Above the rank of yeoman are the liverymen, who in addition to electing City officers, have special privileges within the company. Succession to the Livery is usually achieved by seniority and on condition of the payment of a fine.[15]

[14] Underwood, p. 136. As this term is used in the nineteenth century, it will be used in this thesis.

[15] This term refers to a payment due, such as on admission to the Society, and not usually a financial penalty for a misdoing. For general information on livery companies see W. Carew Hazlitt, *The Livery Companies of the City of London* (London, 1892); George Unwin, with a new introduction by W.F. Kahl, *The Guilds and Companies of London* (London, 1963); Doolittle.

The Society of Apothecaries' governing body is the Court of Assistants. It is made up of the Society's twenty-four most senior members, that is the Master, two Wardens, and twenty-one Assistants. In the nineteenth century the Court generally met in March, June, October and December, with two additional courts held for elections, and a Special Court of Assistants called if urgent matters had to be discussed. The head of the Society, the Master, is an annual appointment with election according to seniority within the Court of Assistants, via the posts of Junior then Senior Warden.[16] The Master and two Wardens make up the Private Court, which meets monthly to deal with the general business of the Society. Complete minutes of the proceedings of both Courts survive and although these are an invaluable source, it is important to recognise their limitations. Providing the official view of proceedings can lead to disputes being glossed over, whilst there are some surprising omissions.[17]

Whilst the Master, Wardens and Court of Assistants govern the Society, two salaried posts, the Clerk and the Bedel, are essential to its operation. The Clerk is in charge of the Society's administrative affairs, dealing with all correspondence and taking the Court minutes. Although a few Clerks were apothecaries, the legal and business skills required by the occupant meant they were frequently lawyers.[18] As the Society's activities in the pharmaceutical trade and as a medical corporation became more complex and contentious, the ability to draft articles and bills was increasingly important. Occupants of the post such as Edmund Bacot (Clerk 1816-34), Robert Brotherton Upton (Clerk 1834-72) and James

[16] These positions were called Renter and Upper Warden respectively until 1817.

[17] For example, despite the Great Fire of London destroying the Society's Hall, the next Court meeting does not refer to the event (CM 29 October 1666). Court of Assistants Minute Books, MS 8200/1-18, 1617-1926, hereafter CM. For details of all Society of Apothecaries' records used in this thesis, see bibliography.

[18] T.D. Whittet, *Clerks, Bedels and Chemical Operators of the Society of Apothecaries*, The Gideon De Laune Lecture (London, 1977).

Richard Upton (Clerk 1872-1901) became well known to the medical profession through representing the Society in the various debates on medical reform.[19] The work of the Clerk was equally important to the Hall trade, drawing up articles of association, advising on legal and financial matters and conducting investigations into its operation. In contrast the Bedel's main role is that of the Society's chief ceremonial officer, attending meetings and special events, and until 1820 an apothecary held the post. The Bedel also has an administrative function, formerly dealing with admissions to lectures at the Hall, although his contribution to the trade was much less than that of the Clerk.[20]

The Unusual Nature of the Society of Apothecaries

The tripartite nature of the Society of Apothecaries made it a unique institution. The conflicting interests that often arose from its functions gave it an ambiguous nature, whilst outsiders often denigrated it as "a mere trading body".[21] Although the Society's identities as a livery company and licensing corporation will not be examined in detail in this thesis because the Hall trade interacted with them in important ways, it is necessary to look at certain aspects of these activities.

The Society's Status as a Livery Company

Although they shared a common structure, the Society was in many ways quite different from the other city livery companies. Many livery companies were increasingly distanced from their crafts, but the Society's responsibilities developed to encompass changes in the role of the apothecary. The late-seventeenth and eighteenth centuries saw a substantial decline in the livery companies' fortunes. Companies became much less attractive for new members when the economic advantages that came with their earlier monopolistic trading

[19] Whittet, 1977, pp. 17-19.

[20] Some of the Bedel's duties are described in CM 22 August 1804, 29 October 1824.

[21] Dr Muehry of Hanover, quoted in *The Lancet*, 2 March 1839, p. 844.

positions disappeared.[22] Decreasing membership was a serious problem as, in addition to letting corporation[23] estates, a company's income primarily came from levying fines on members, either in terms of membership fees, quarterage[24] or penalties for trading infringements. However, with the incentives of dividends from the Hall trade and purchasing drugs from its laboratory, membership of the Society of Apothecaries had unique benefits. Although it is often difficult to obtain data on the membership of the livery companies, in terms of size the Society was one of the larger of the minor livery companies in the nineteenth century.[25]

Despite the additional incentives to join, the Society of Apothecaries faced a significant drop in membership in the second half of the eighteenth century (see table). However, it appears that the Society's new licensing role, following the Apothecaries Act of 1815, reversed this trend, although it is important to note that holding the Licence of the Society of Apothecaries (LSA) did not make one a member of the Society.

Membership of the Society of Apothecaries[26]

-	1702	1731	1750	1770	1790	1800	1810	1820	1822
Livery	123	141	145	150	150	150	149	147	149
Yeomanry	268	276	213	165	154	148	200	289	309
Total Members	391	417	358	315	304	298	349	436	458

[22] J.R. Kellett, "The Breakdown of Gild and Corporation Control over the Handicraft and Retail Trade in London", *Economic History Review,* second series **10** (1958), pp. 381-94; L.D. Schwarz, *London in the Age of Industrialisation: Entrepreneurs, labour force and living conditions, 1700-1850* (Cambridge, 1992), pp. 210-21.

[23] In this context "corporation" refers to an incorporated body of traders, i.e. a livery company. It is not to be confused with "The Corporation", the governing body of the City of London.

[24] This was a tax paid every quarter to a livery company or guild.

[25] Hazlitt, pp. 81, 85-6.

[26] Membership Lists of the Society of Apothecaries.

The fortunes of the livery companies were tied to those of the City. This left many in severe financial difficulties following the Great Fire, but some later benefited from the increase in London property values.[27] However, the Society's finances were subject to a further influence: the demand for drugs. Its trading activities brought in additional income through the rent paid by the stock companies operating at the Hall. Under a lease negotiated in 1786, part of this rent included nine shillings in every pound of profit made by one section of the trade. However, the Society only experienced the benefits of profits in this way until 1822, as afterwards a fixed sum was paid as rent.[28] Reciprocally, the Society's overall financial position also affected the trade, as the Society did not want the trade to be a drain on its resources when it had other responsibilities to fulfil.

The Society's Status as a Medical Licensing Corporation

When the Society was formed its purpose was to regulate the practice of apothecaries in London, a role that involved administering and examining apprenticeship and inspecting shops.[29] However, as the function of the apothecary changed so did the Society's objectives and activities. As the 1617 charter omitted placing any constraints on apothecaries giving medical advice,[30] disputes regarding practice were always likely. Having supported the separation of the apothecaries, the College wanted to assert its authority over the new corporation. This was done through the production of the first *Pharmacopoeia Londinensis* in 1618, which was accompanied by a royal proclamation

[27] Doolittle, p. 11; Hunting, 1998, p. 153; Hazlitt, pp. 83-4.

[28] E/7 Loose Papers, Box 6, Clerk's Report re leases held from the Corporation, 1877. As the Society had invested in the laboratory in 1672, it also received a dividend during the laboratory's early years and in 1702 it could take eight percent of laboratory subscriptions for its own use (Underwood, p. 153).

[29] Although visiting during the seventeenth century was sporadic (Wallis, 2002, p. 89) the Society continued inspecting apothecary shops with the College until 1858. The Society also inspected apothecary shops independently under the terms of the 1815 Act until 1843 (PC 5 September 1843).

[30] Burnby, 1983, pp. 6-7.

compelling the apothecaries to follow the College's instructions for drug preparation.[31] Additionally the College expected the Society to assist it in its attempts to control irregular practitioners, but was disappointed. Consequently the College soon tried to assert its supremacy over the apothecaries, beginning numerous disputes between them.[32] The College's attacks were one of the many challenges that the Society faced in the seventeenth century. The Civil War, Plague, Great Fire of London and political attacks on the City from Charles II and James II all threatened its existence.[33] Although the Society had to rebuild its Hall after the Great Fire, it had benefited from a decline in the fortunes of the College due to the uncertain political situation.[34]

However, by the 1670s the disputes between the College and the Society had resumed. Whilst the divisions of medical practice were always less than clear-cut, the apothecary's role increasingly involved the practice of medicine rather than shop-based dispensing.[35] The College of Physicians opposed this and sued William Rose, an apothecary, for practising physic in 1701. The changing role of the eighteenth-century apothecary is

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[31] Clark, vol. 1, p. 227; Matthews, 1962, pp. 75-6; Underwood, p. 28; Wallis, 2002, p. 36. Although the apothecaries were in theory compelled to follow the *Pharmacopoeia*, they used other methods when appropriate.

[32] The Society's existence was threatened when its charter was questioned by *Quo Warranto* proceedings (1635-40) resulting from the College's protests about certain apothecaries' actions. See Underwood, pp. 42-57, 107-135; R.S. Roberts, "The Personnel and Practice of Medicine in Tudor and Stuart England, Part II, London", *Medical History*, **8** (1964), pp. 217-34; Harold J. Cook, *The Decline of the Old Medical Regime in Stuart London* (Ithaca, 1986); Wallis, 2002, pp. 51-84.

[33] Underwood, pp. 66-9, 91-106, 111-2; Hunting, 1998, pp. 57-73.

[34] Cook, 1986, chapters three and four.

[35] Burnby, 1983, p. 114; Anne Digby, *Making a Medical Living: Doctors and Patients in the English Market for Medicine, 1720-1911* (Cambridge, 1994), pp. 28-30.

discussed elsewhere,[36] so the focus here is on certain events that were relevant to the Society of Apothecaries. For example, the Rose Case of 1704 reversed an earlier guilty judgement and resulted in the right of an apothecary to practise medicine being legally sanctioned.[37] As the apothecary increasingly worked as a general practitioner during the eighteenth century, he was less involved in shop-keeping and manufacturing, with this role fulfilled by chemists and druggists. Consequently the Society's priorities shifted to reflect the change in its members' activities. However, the Society still wanted to carve out a distinctive role for the apothecary within the complex world of medical occupations, so it was important that the apothecary maintained his knowledge about drugs. These factors all had important implications for the Society's pharmaceutical trade and the direction that the Society would take in the nineteenth century.

This shift in the apothecaries' activities is reflected in the Society's failure in 1748 to promote a Bill which would have obliged all apothecaries, chemists and druggists who produced and stocked medicines for sale in London to undergo examination by the Society and if successful be admitted to its membership.[38] The Bill had been prompted by the Society's fears that it could face extinction due to the declining number of apprentices, but met with opposition from the College of Physicians due to the prospect of such an increase in the Society's powers. If passed, the Bill would have greatly boosted the Hall pharmaceutical trade, as Society members would have supplied all drugs in London.

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[36]Bernice Hamilton, "The Medical Professions in the Eighteenth Century", *Economic History Review,* second series **4** (1951), pp. 141-69; Burnby, 1983; Irvine Loudon, *Medical Care and the General Practitioner, 1750-1850* (Oxford, 1986).

[37] Harold J. Cook, "The Rose Case Reconsidered: Physicians, Apothecaries, and the Law in Augustan England", *Journal of the History of Medicine and Allied Sciences,* **45** (1990), pp. 527-55.

[38] Anon., "Attempted Legislation in 1748", *Chemist and Druggist*, **105** (1926), pp. 198-200.

However, its defeat meant that the Society was increasingly concerned about the activities of the apothecary in medical practice rather than in drug retailing.

The priority given to medical practice was confirmed in 1774, when entrance to the Livery was restricted to those practising medicine.[39] In the same year, admission to one of the Society's stock companies, the Laboratory Stock, was restricted to those "undertaking to exercise the art and mystery of an apothecary".[40] All of these actions made the Society less relevant to those involved in the manufacture and supply of drugs,[41] something that was reflected in the continuing decline in membership in the second half of the eighteenth century.

The activities of the increasing number of chemists and druggists[42] during the eighteenth century also concerned the apothecaries. As apothecaries relied on charging for the medicines they supplied to earn a living, growing competition from chemists and druggists affected their income. Organisations such as the General Pharmaceutical Association and the Association of Apothecaries and Surgeon-Apothecaries,[43] which included a significant number of Society members, hoped to regulate the activities of chemists and druggists through new legislation. However, the Society never succeeded in obtaining legislation that would give it a central role in pharmaceutical licensing.

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[39] CM 15 March 1774.

[40] E/7 Loose Papers, Box 3, Laboratory Stock Articles, 31 December 1774.

[41] Whilst Sylvanus and Timothy Bevan of the Plough Court pharmacy (which later became Allen and Hanburys) were freemen of the Society, when Joseph Gurney Bevan took over the business in 1775 he was not a member and later chose to join the Woolmen's Company (Burnby, 1983, pp. 50-1).

[42] Glenn Sonnedecker (rev.), *Kremers and Urdang's History of Pharmacy* (Philadelphia, 1976), pp. 104-5; Loudon, pp. 133-8; Porter and Porter (Corbyn), 1989, pp. 282-4; Burnby, 2003.

[43] Loudon, pp. 136-8, 152-9.

The Apothecaries Act of 1815 gave the Society an important function in medical education, as it was now responsible for examining medical practitioners.[44] However, the Society can hardly be said to have actively sought the role and rather had "greatness thrust upon it".[45] To administer the Act, the Society elected a Court of Examiners, consisting of twelve men all of whom were longstanding members of the Society.[46] Although the Act had its limitations[47] and the Society's administration of it attracted criticism, it placed the Society at the forefront of medical licensing and its requirements played a role in shaping the development of medical education in the United Kingdom.[48]

The Society's responsibilities in medical licensing were in contrast to its increased distance from the practice of pharmacy. In addition to resisting the apothecaries' attempts at controlling them, many chemists resented the Society and despised its monopolies of trade with government bodies.[49] Eventually the Society's activities in pharmaceutical education were eclipsed by the Pharmaceutical Society, founded in 1841 by an elite of mostly

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[44] Zachary Cope, "The influence of the Society of Apothecaries on Medical Education", *BMJ*, 1956, pp. 1-6; Charles Newman, *The Evolution of Medical Education in the Nineteenth Century* (Oxford, 1957); S.W.F. Holloway, "The Apothecaries' Act, 1815: A Reinterpretation", *Medical History,* **10** (1966), pp. 107-29, pp. 221-36; M. Jeanne Peterson, *The Medical Profession in Mid-Victorian London* (Berkeley, 1978); Loudon; Susan C. Lawrence, "Private Enterprise and Public Interests: Medical Education and the Apothecaries' Act, 1780-1825", in Roger French and Andrew Wear (eds.), *British Medicine in an Age of Reform* (London, 1991), pp. 45-73.

[45] The same phrase appears in Cope, 1956, p. 4 and Holloway, 1966, p. 128.

[46] See Loudon, pp. 163, 168-70, regarding complaints about the constitution of the Court of Examiners.

[47] Holloway, 1966.

[48] Cope, 1956; Peterson; Loudon; Lawrence, 1991.

[49] Bell and Redwood; Patrick Wallis, "The first English histories of pharmacy" *Pharmacy in History,* **42** no. 1- 2 (2000), pp. 36-46.

London chemists.[50] The Society of Apothecaries opposed this development[51] but the Pharmaceutical Society flourished through educating and licensing pharmacists and developing pharmaceutical policy. Although the Society of Apothecaries had been medically orientated for a considerable time, the formation of the Pharmaceutical Society confirmed the irrelevance of membership of the Society of Apothecaries for those engaged in the pharmaceutical trade. Although the Hall continued examining Apothecaries' Assistants,[52] its corporate pharmaceutical functions had diminished.

The priority given to medical pursuits had a major impact on the pharmaceutical trade at the Hall. In the nineteenth century, the Society wanted to portray itself as a respectable livery company and medical corporation undertaking a public service in supplying quality drugs, and this constrained its trading activities. However, these activities were also shaped by the legacy of the Hall's eighteenth-century stock companies.

The Pharmaceutical Trade of the Society of Apothecaries

The 1617 charter gave the Society a responsibility to ensure the supply of high-quality drugs and an authority in pharmacy, through the right to inspect apothecary shops. As early as 1623, the importance of this authority was seen when the Society's Master and Wardens were amongst those asked to judge the quality of drugs in surgeons' chests for the East

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[50] S.W.F. Holloway, "The Orthodox Fringe: the Origins of the Pharmaceutical Society of Great Britain", in W.F. Bynum and R. Porter (eds.), *Medical Fringe and Medical Orthodoxy, 1750-1850* (London, 1987), pp. 129-57; S.W.F. Holloway, *The Royal Pharmaceutical Society of Great Britain: A political and social history, 1841-1991* (London, 1991), chapter three.

[51] Holloway, 1991, p. 101.

[52] The Apothecaries Act gave the Hall responsibility for educating and examining Apothecaries' Assistants, but the development of the Pharmaceutical Society's qualifications and legislation in the early twentieth century marginalized the qualification (Hunting, 1998; pp. 229-35).

India Company.[53] In the same year, the Society took practical action to ensure that high-quality drugs were sold by forming a committee to set up a dispensary producing "epidemical medicines".[54] Patrick Wallis has highlighted how the Society's supervision of epidemical medicines, such as theriac and mithridate, had been included in an early draft of its charter and how the concerns of the King and Privy Council about plague were a reason for their support for the Society.[55] The extent and success of the Society's dispensary are unclear.[56] However, as complex preparations were to be produced,[57] the Society's intervention in manufacturing can be seen as undertaking additional responsibility to guarantee higher standards. The next logical step to ensure the supply of quality drugs was for the Society to undertake manufacture itself. This appeared likely when the Master, Edward Cooke, donated five hundred pounds to establish a laboratory on waste ground by the Thames in 1641,[58] although the Civil War prevented any progress with the project.

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[53] D.G. Crawford, *A History of the Indian Medical Service, 1600-1913,* vol. 1 (London, 1914), pp. 22-3.

[54] CM 22 May 1623.

[55] Wallis, 2002, p. 40-1.

[56] Wallis suggests that the Assistants planned to work together and view ingredients before private manufacture began (Wallis, 2002, pp. 90-1).

[57] One account of the Hall trade suggests that the project was "for compounding the more elaborate confections" that were most liable to adulteration. "The Origin, Progress and Present State of the Various Establishments for conducting chemical processes and other medicinal preparations at Apothecaries Hall" (London, 1823), (hereafter cited as 1823 Booklet), p. 6. "Apothecaries Hall" is often written without an apostrophe and in quotes where this occurs it will be written as such without use of "sic".

[58] CM 12 October 1641. Cooke was one of the wealthiest trading apothecaries, illustrated by the £14,000 that he left to the Parliamentarian cause.

The Foundation of the Laboratory

It was not until the rebuilding of the Hall after the Great Fire that the proposal to construct a laboratory was resurrected. The importance of this event cannot be over-emphasised, especially as the laboratory's centrality to the Society's activities is frequently overlooked. On 8 September 1671 an order that a laboratory should be erected and finished was made and the following January formal orders were placed before the Court of Assistants for approval.[59] The laboratory was situated in the large vault under the new Great Hall and was financed by one hundred pounds from the Society and subscriptions from seventy members. The total capital available was around £1,000, greatly exceeding the £225 to fit out the chemistry laboratory in the Ashmolean Museum in Oxford, where its operator, Christopher White, also made medicines for purchase.[60] It is important to see the development of the Society's laboratory in parallel with the number of institutional and private laboratories existing at this time[61] and in the context of the increasing significance of the experimental laboratory as a place where knowledge could be produced.[62]

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[59] CM 8 September 1671, 4 January 1672. As the first order was made in 1671 some sources give this as the date of the laboratory's foundation, but it was not until the following year that the orders were implemented and a laboratory constructed.

[60] R.T. Gunther, *Early Science in Oxford,* vol. 1, Chemistry, Mathematics, Physics and Surveying (Oxford, 1923), p. 45; L S. Sutherland and L.C. Mitchell (eds.), *History of Oxford University,* vol. 5, The Eighteenth Century (Oxford, 1986), p. 644.

[61] Gunther, pp. 36-42; Charles Webster, *The Great Instauration: Science, Medicine and Reform, 1626-1660* (London, 1975), p. 302; Michael Hunter, *Science and Society in Restoration England* (Cambridge, 1981), p. 130; Steven Shapin, "The House of Experiment in Seventeenth Century England", *Isis*, **79** (1988), pp. 373-404.

[62] Steven Shapin and Simon Schaffer, *Leviathan and the Air Pump: Hobbes, Boyle and the Experimental Life* (Princeton, 1985).

However, the Society's laboratory was designed for drug production and was one of the earliest in England to manufacture drugs on a large scale. It was administered by a management committee appointed from the subscribers. A treasurer was elected to deal with its finances and auditors were selected to monitor its activities.[63] The subscribers benefited from their investment in two ways: they could purchase drugs manufactured in the laboratory for their own businesses at a substantial discount, and if the laboratory was successful a dividend was paid to them.

The laboratory's purpose was to produce chemical medicines, which had been incorporated into medical practice since the late sixteenth century, encouraged by the work of Paracelsus and later Van Helmont in alchemy and chemistry.[64] A chemical operator was employed at the Hall to manufacture these medicines, something that was an innovative move at the time. To maintain quality all drugs were to pass the inspection of the Master, Wardens and Court of Assistants, whilst the laboratory orders stated that the College of Physicians should be invited to view the materials prior to manufacture.[65]

The first chemical operator, Samuel Stringer, was appointed under such unfavourable terms that he was unable to make a living so he resigned soon after.[66] However, his successor Samuel Hull was more fortunate[67] and from 1673 the post was a then rare

[63] Sundry Account and Memoranda Book, MS 8204, contains extracts relating to decision to form a laboratory, 1672-1695 (hereafter cited as Laboratory Memoranda Book). The entry for 4 January 1672 contains the orders upon which the laboratory was founded.

[64] Debus, 1965; Webster, 1975.

[65] It is unclear whether the College made regular inspections (Laboratory Memoranda Book, 4 January 1672).

[66] In addition to putting up £200 of his own estate as security, Stringer was paid no salary and only provided with half of the working stock and half of the laboratory workmen's wages. The only benefit was a house. Whittet, 1977, pp. 54-5; CM 29 January, 11 March 1672, 18 March 1673.

[67] CM 15 April, 5 June 1673, 28 April 1674.

example of a full-time paid position in chemistry. The early Hall operators and their assistants attained a prominence in chemistry that was not seen again amongst them until the nineteenth century. Hull was assisted by Peter Stahl, the Strasbourg chemist who had taught chemistry in Oxford to Boyle and his circle,[68] whilst Nicholas Staphorst, a countryman of Stahl and friend of Sir Hans Sloane, was chemical operator from c.1676-c.1701.[69] The friendship between the two men illustrates the links between the botanical and chemical sides of the Society. Staphorst is reputed to have taught Sloane about chemical medicines and also translated botanical books for him. Sloane's extensive natural history collections included important medicinal specimens and he donated the Chelsea Physic Garden to the Society in 1722.[70] It has been suggested that another German chemist, Ambrose Godfrey Hanckwitz, operator to Robert Boyle and renowned for his manufacture of phosphorus, worked in the Hall laboratories,[71] but the lack of supporting evidence casts doubt on this. All of these émigré apothecary-chemists soon found a position in England's scientific scene, with their chemical expertise and social connections having a positive impact on the nascent Hall laboratory.

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[68] CM 15 April 1673; G.H. Turnbull, "Peter Stahl, the First Public Teacher of Chemistry at Oxford", *Annals of Science,* **9** (1953), pp. 265-70; T.D. Whittet, "Apothecaries and their Lodgers", *Journal of the Royal Society of Medicine*, **76**, supplement no. 2 (1983); Guy Meynell, "Locke, Boyle and Peter Stahl", *Notes and Records of the Royal Society of London*, **49** (1995), pp. 185-92.

[69] W.H.G. Armytage, "The Royal Society and the Apothecaries", *Notes and Records of the Royal Society*, **11** (1954), pp. 22-37; Underwood, p. 152; Whittet, 1977, pp. 57-8; Hunting, 1998, p. 161.

[70] It is possible that the friendship encouraged Sloane's sympathetic attitude to the Society, which culminated in the donation of the garden. For the physic garden's significance see p. 29.

[71] Both Hunting, 1998, p. 161 and Whittet, 1977, pp. 59-61 base Hanckwitz's link on an account of a visit by Dr Erndtel in late 1706, which describes Hanckwitz as "formerly Master of the Laboratory or Operator". See R.E.W. Maddison, "Studies in the Life of Robert Boyle FRS, Part V, Boyle's Operator: Ambrose Godfrey Hanckwitz, FRS", *Notes and Records of the Royal Society,* **11** (1955), pp. 159-88.

Motivations for the Laboratory's Foundation

The foundation of the laboratory in 1672 was an attempt to raise the status of the Society's pharmaceutical activities and to ensure the supply of high-quality chemical medicines. Although chemical preparations were not novel by 1670, the increasing popularity of Paracelsian medicine after 1640 and the activities of organisations such as the Society of Chemical Physicians[72] meant that it was important for the Society to establish a role for chemistry in the apothecaries' activities and thereby defend its reputation as a pharmaceutical authority. In constructing a laboratory these objectives were achieved. The 1672 laboratory orders emphasize the Society's objective to vindicate its reputation because "the Company of Apothecaries of London have been publicly traduced by the Pseudo Chemists of these tymes for their ignorance in the spagirick part of pharmacy".[73] Furthermore, by employing a chemical operator to manufacture chemical medicines on a large scale, the Society was showing that it was abreast of developments in chemical medicine. These motivations were similar to those ascribed by Charles Webster to the College of Physicians, when it opened a laboratory in the 1650s to show its critics that it had absorbed Paracelsian teachings.[74]

The laboratory orders of 1672 also illustrate the Society's concerns about quality, as through the new laboratory it sought to "assure the College of Physicians, their patients

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[72] Charles Webster, "Alchemical and Paracelsian Medicine", in Charles Webster (ed.), *Health, Medicine and Mortality in the Sixteenth Century* (Cambridge, 1979), pp. 301-34; Harold J. Cook, "The Society of Chemical Physicians, the New Philosophy, and the Restoration Court", *Bulletin of the History of Medicine,* **61** (1987), pp. 61-77.

[73] Laboratory Memoranda Book, 4 January 1672. "Traduced" means slandered or maligned and in this context "spagirick" refers to chemical (Paracelsian) medicines.

[74] Webster, 1975, pp. 312-4. The College's action after 1640 is significant as this was a time when "Paracelsian medicine was transformed from a dormant force into a coherent social movement" (Webster, 1975, p. 274).

and all others concerned that all chemical preparations shall be skilfully, faithfully and exactly made and sold by an operator of their own fraternity at the Apothecaries' Hall".[75] This concern for quality went back to the 1617 charter, which delineated a role for the Society as a guarantor of drug quality, whilst the plans for a dispensary indicated that the Society saw a role for itself as a reputable authority to supervise the manufacture of more complex medicines.

A further impetus for the laboratory's foundation was the demand from the Society's members for chemical medicines. Members could purchase the chemical medicines manufactured at the Hall and sell them in their apothecary shops. This greatly assisted their trading activities, as manufacturing these preparations was expensive and required specialist equipment and expertise, factors that often made it beyond the means of individual apothecaries.

Another reason for the foundation of the laboratory was to assist the education of apothecaries. The subscribers had free access to the laboratory "to inform themselves by what they shall here see in the knowledge of ye chimical part of pharmacy".[76] Apprentices were also allowed access with some working there during their apprenticeship, before going on to employment in the trade.

Whilst the Society specified the above reasons as its motivations for developing a laboratory at the Hall, another is also important. From the disputes occurring between the Society and the College of Physicians at the time, it seems likely that political factors were influential. Although the references to the College in the laboratory orders about inspecting

[75] Laboratory Memoranda Book, 4 January 1672.

[76] CM 29 January 1672.

ingredients[77] indicated a conciliatory approach by the Society, it was also keen to mark out a role for itself in manufacturing chemical medicines. The College of Physicians had opened a laboratory in the 1650s, with the apothecary William Johnson employed to make chemical medicines there.[78] However, the laboratory was destroyed in the Great Fire, whilst Johnson had succumbed to the plague. Consequently the College no longer prepared chemical medicines, so the path was clear for the Society to undertake this work.[79] In constructing its own laboratory the Society was able to mark out its territory in drug manufacture and show that apothecaries, not physicians, could provide patients with the best quality drugs.

This was especially important because relations with the College were tense. Many physicians left London during the plague and consequently an increasing number of apothecaries moved into the practice of medicine.[80] In the late 1660s some physicians fought back against these encroachments with pamphlets attacking the apothecaries' supposed greed, ignorance and malpractice. The most virulent publication was in 1670 by Christopher Merrett,[81] keeper of the College's library and museum, which especially

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[77] The College was also invited to recommend which preparations should be sold (Laboratory Memoranda Book, 4 January, 30 November 1672).

[78] Clark, vol. 1, p. 286; Underwood, p. 99.

[79] Allen Debus, *The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth and Seventeenth Centuries* (New York, 1977), p. 511.

[80] Hamilton, 1951, p. 161; Underwood, pp. 111-2.

[81] Christopher Merrett, *A Short view of the Frauds and Abuses committed by Apothecaries,* 1670. For information on the disputes see Charles F. Mullett, "Physician vs. apothecary, 1669-1671. An episode in an age long controversy", *Science Monthly,* **49** (1939), pp. 558-65; Albert Rosenberg, "The London Dispensary for the Sick Poor", *Journal of the History of Medicine and Allied Sciences,* **14** (1959), pp. 41-56; Underwood, pp. 115-20; Frank H. Ellis, "The Background of the London Dispensary", *Journal of the History of Medicine and Allied Sciences,* **20** (1965), pp. 197-212; Cook, 1986, pp. 176-8.

offended the Society because of his status as an honorary freeman. The attacks in 1670 were significant, as in asserting that physicians should dispense their own medicines, the apothecary's role was threatened.[82] Thus in choosing to build a laboratory at this time, it appears that the Society was attempting to reassert its precedence in drug production and supply. However, the competitiveness with the College on the subject continued, with the College's dispensary and laboratory, opened in Warwick Lane in 1698 to supply drugs to the sick poor, seen by the Society as encroaching on its trade.[83]

The laboratory's construction was not the only development that the Society undertook during the 1670s. In 1673 it established a Physic Garden at Chelsea for use as an educational resource for its members and apprentices.[84] In establishing both a laboratory and garden, the Society hoped to raise its status in the fields of chemistry and botany. These subjects were essential to the apothecary's practice, with the educational function of the two new developments confirmed by the associated plans for a library in 1681.[85] The garden was also useful for the pharmaceutical trade, as in its early years herbs and medicinal plants were supplied to the laboratory.[86]

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[82] Rosenberg, p. 45.

[83] For varying accounts of the dispensary see Rosenberg; Ellis; Clark, vol. 1, pp. 428-47; Underwood, pp. 128-30, 382-88; Cook, 1986, pp. 233-9.

[84] The garden remained in the Society's care until it was transferred to the Trustees of the London Parochial Charities in 1899. See Henry Field and R.H. Semple, *Memoirs of the Botanic Garden at Chelsea* (London, 1878); Hunting, 1998, pp. 116-151; Sue Minter, with research by Ruth Stungo, *The Apothecaries' Garden: A New History of the Chelsea Physic Garden* (Stroud, 2000).

[85] Laboratory Memoranda Book, 6 October 1681.

[86] For example mint was obtained from the garden in 1678 (CM 14 August 1678).

The Development of the Pharmaceutical Trade at Apothecaries' Hall

For the first forty years of the Hall trade drugs were sold directly through the laboratory. Within ten years it was profitable[87] and when it was founded the subscribers must have realised the potential for financial gain. Although it has been incorrectly stated that it was only from 1682 that the sale of Hall drugs was opened up to non-members,[88] from the laboratory orders of 1672 it is clear that the Society's original objective was supplying chemical medicines to all. It was "ordained that when we are ready for it there be copies of the said catalogue and prices dispersed throughout the country to the end they may know where to be furnished with such chemical preparations as will be owned for good by us".[89] Although the 1672 orders suggest a nationwide supply, the bulk of the laboratory's early business was in London and mostly to members. The growth of a wider trade occurred gradually, as practitioners and hospitals "applied to be furnished with chemical medicines".[90]

The first alterations to the laboratory's administration came in 1702 when the capital was increased to £2,000 through the issue of new shares, whilst a discount of five percent was given on purchases if bills were settled by 25 March.[91] The supply of drugs from the laboratory was formalised on 3 February 1713 when a set of articles of co-partnership

[87] PC 3 April 1677, CM 5 August 1681; Laboratory Memoranda Book, 29 June 1680.

[88] Barrett, p. 102; Whittet, 1977, p. 52; Hunting, 1998, p. 160; Sonnedecker, p. 102. The confusion appears to have arisen from a proposal to restrict purchases to members (CM 24 October 1682).

[89] Laboratory Memoranda Book, 4 January 1672.

[90] The only official statement about the trade's development is found in the Laboratory Stock Articles. For example in the articles dated 31 December 1774 (E/7 Loose Papers, Box 3).

[91] E/7 Loose Papers, Box 3, Rules and Orders for the better management of the Elaboratory, 1702; CM 9 May 1702.

between the subscribers were sealed. This formed the stock company known as the "Elaboratory Stock" (hereafter the Laboratory Stock).[92]

The Laboratory Stock had a similar structure to the Navy Stock, the stock company which had been formed at the Hall in 1703 to supply drugs to the Navy. This had arisen out of another dispute with the College of Physicians, as when the Society heard that the College proposed to supply medicines from its dispensary to the army and fleet bound for the West Indies it thought that the College was encroaching on its trade.[93] The Society protested and its members and supporters used their influence to alter the decision.[94] Queen Anne's husband Prince George, in his capacity as Lord High Admiral, ordered the Society to provide the best medicines possible for the Fleet, with the drugs to be inspected by physicians in the commission of the Sick and Wounded Board, along with the Governors of the Surgeons' Company.[95]

Articles of co-partnership for the Navy Stock were drawn up, with subscribers asked to contribute between thirty and fifty pounds each to raise £6,000 capital.[96] The formation of

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[92] Joint Laboratory Stock Articles, 1713, MS 8214. Three further sets of articles were drawn up in 1728, 1767 and 1774.

[93] CM 5 January 1703. During the 1690s the Society and the College both sought to supply the forces with drugs. Harold J. Cook, "Practical Medicine and the British Armed Forces after the Glorious Revolution", *Medical History,* 34 (1990), pp. 1-26; Hunting, 1998, pp. 164-6.

[94] Charles Bernard, Master of the Barber Surgeons and Sergeant-Surgeon to Queen Anne, and James St Amand, former Alderman and Tory MP, used their influence with the Queen, whilst the Society's Master, Thomas Gardiner, approached the Secretary of State, Lord Nottingham (CM 5 January 1703).

[95] CM 3 July 1703.

[96] The actual capital raised was £5,470, with ninety-nine members subscribing. E/7 Loose Papers, Box 3, Case laid before Counsel by the General Committee of the Navy Stock, March 1767 (hereafter cited as Counsel Case, 1767).

the Navy Stock marked the beginning of a more commercial phase for the Society and it was from this that a pharmaceutical trade supplying drugs to various government departments and medical institutions grew. The agreement of 1703 gave a monopoly of Navy supplies to the Society and although there were exceptions to this[97] it established a pattern of business based on status and tradition which characterised the Hall pharmaceutical trade well into the nineteenth century.

The Navy Stock articles also established the format of the Society's relationship with the trading activities undertaken at its Hall. The articles stated that "this undertaking and all agreements, contracts, buyings, sellings and dealings relating thereto be carried on in the name of the said Master Wardens and Society of the Art and Mystery of the Apothecaries of the City of London at or near their Common Hall in Blackfriars London and be governed by the Court of Assistants of the said Company and a Committee by them to be chosen of the Master and Wardens for the time being and 24 other subscribers".[98] This statement is significant as although the profits of the stock were shared between the subscribers, the trade was carried on in the Society's name and was thus its responsibility. To ensure that the wishes of the Society were followed, the Court of Assistants was given control over the undertaking. This control was exercised through the managing committee it elected and its choice of treasurer and deputy treasurer.

The Laboratory Stock also appointed a treasurer and was governed by a management committee, consisting of the Master, Wardens and eighteen other subscribers. The members of both the Navy and Laboratory committees were split between the ranks of the

[97] For example William Cookworthy obtained the contract to supply the hospital ship, Rupert at Plymouth (Hunting, 1998, p. 172).

[98] E/7 Loose Papers, Box 3, Copy of Articles of Co-partnership of the Navy Stock, 3 August 1703 (hereafter cited as 1703 Navy Articles).

Court, Livery and Yeomanry, a composition which meant that all classes of the Society's membership were represented. Both the Laboratory and Navy Stocks elected auditors to approve the accounts and propose the dividends, whilst a sub-committee structure to administer the buying, inspection and pricing of drugs also evolved.[99]

Although the Laboratory and Navy Stocks had a common structure, they fulfilled distinct functions and operated independently. Under the terms of its foundation, the Navy Stock was instructed that "all chemical preparations to be used for this service to be had and taken of the present laboratory".[100] This established a distinct role for the Navy Stock producing galenicals, with the Stock probably employing a galenical operator from 1703.[101] His work centred around preparing pills, compounding preparations and grinding drugs, whilst the chemical operator's work involved processes such as distillation, extraction and sublimation. Consequently one could purchase drugs as diverse as calomel, sulphuric acid and ipecacuanha wine from the Laboratory Stock, but powdered Peruvian bark, colocynth pill, and Philonium Londinense (a confection of opium) from the Navy Stock.[102] This division of manufacturing mirrors wider practice in eighteenth-century

[99] CM 27 November 1766.

[100] 1703 Navy Articles.

[101] A galenicum certainly existed at the Hall in 1710. See W.H. Quarrell and Margaret Mare (eds.), *London in 1710 from the travels of Zacharius Conrad von Uffenbach* (London, 1934), p. 111. However, the first occupant of the post that I have definitely identified is James Waugh (CM 23 January 1747). See Appendix C for a list of galenical operators.

[102] A full list of the chemical medicines sold by the Hall in 1764 and 1791 is given in *Catalogus Medicamentorum Chymicorum,* AHA. No lists of drugs sold by the Navy Stock exist, so this information is based on the purchases made by St Bartholomew's Hospital (St Bartholomew's Hospital, General Receipt Books, HB 10/ 1-17, 1731-84, St Bartholomew's Hospital Archive).

pharmacy, although as J.K. Crellin has commented, many eighteenth-century authors noted that the distinction between galenical and chemical could appear arbitrary.[103]

The separate operation of the two stocks meant that the laboratory under the Hall was divided into chemical and galenical manufacture, whilst customers received separate bills from each stock.[104] Overall the Navy Stock had greater administrative responsibilities, as it had to deal with the complexities of large-scale drug supply, whilst the Laboratory Stock possessed more extensive manufacturing capabilities.

Initially, the Navy and Laboratory Stocks also supplied different customers. Although the sale of chemical medicines was not restricted, the 1703 Navy Stock articles stated "that no medicines to be made on account of this Stock be sold or disposed of but for the use of the Navy or other public service and not to any private person or account whatsoever".[105] However, these constraints did not remain throughout the stock's duration.[106] Despite low profits in its first forty years,[107] business with public companies, hospitals and merchants developed and the Navy Stock became the more profitable of the Hall's trading

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[103] J.K. Crellin, "The development of chemistry in Britain through medicine and pharmacy, 1700-1850", PhD Thesis, London University, 1966, pp. 238-9.

[104] St Bartholomew's Hospital, General Receipt Books, HB 10/ 1-17, 1731-84.

[105] 1703 Navy Articles.

[106] Although the situation before 1741 is uncertain, in this year it was ruled that all physicians, surgeons, apothecaries and chemists were allowed to purchase galenical medicines from the Navy Stock (CM 20 August 1741). However, following complaints that these sales were injuring the private trade of the Society's members, the ruling was over-turned (CM 4 March, 22 May 1745). Although this was confirmed in 1749 (CM 23 February 1749), the decision did not remain for long as when new Navy Stock articles were drawn up in 1766, the restrictive clause in the co-partnership was removed.

[107] On several occasions, so few members were interested in subscribing to the Navy Stock that winding it up was considered (Counsel Case, 1767).

concerns.[108] Consequently an enlargement of capital was required in 1766. In the new Navy Stock articles that accompanied this, subscription was restricted to liverymen, making the opportunity to purchase a share in the Navy Stock a further incentive for progression to the Livery.[109]

The Navy Stock's trade was boosted further when it obtained a monopoly of supplying drugs to the East India Company in 1766.[110] In addition to the income generated, this event was significant as it emphasised the importance of the Society's provision of high-quality drugs. The East India Company Directors chose to purchase from the Hall, as "there was a certainty of being supplied by them with the best medicines and drugs".[111] However, as the East India Company Directors acknowledged, the Society's prices were higher than other suppliers. This reputation had been quickly established and as early as 1717 the Directors of the Greenwich Hospital complained about the sixty-percent profit made on Hall drugs.[112] However, the East India Company and the Navy were happy to pay a premium because it was essential that their drugs were of good quality as they were transported in conditions where they were likely to deteriorate. Additionally, the strength of the Society's reputation for quality absolved customers from checking the drugs themselves.

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[108] Trade Account Book, 1730-72, MS 8225.

[109] However, this restriction meant that the Navy's management committee would no longer include yeoman (E/7 Loose Papers, Box 3, Articles of Co-partnership of the Navy Stock, 16 December 1766; Counsel Case, 1767).

[110] Supply to the East India Company began in 1704. Oriental and India Office Collections (OIOC), British Library, Court of Directors Minutes, East India Company, B/47, 18 October 1704, p. 828. There were various dealings between the two organisations over the next fifty years.

[111] OIOC, Court of Directors Minutes, East India Company, B/82, 29 October 1766, pp. 238-9.

[112] When the Society refused to reduce its profits, the Directors used another supplier (ADM 67/5, Greenwich Hospital, General Court and Directors Minutes, 29 June, 19 October 1717, PRO).

Although during the eighteenth century reputable firms such as the Corbyns of Holborn, the Bevans of Plough Court and William Jones of Covent Garden supplied medics, hospitals and colonies,[113] the Society's manufacturing capacity was virtually unchallenged. The scale of its establishment enabled the Hall trade to deal with large orders at short notice, something that was especially important to its customers engaged in military activity and that could not be matched by its competitors. Through establishing a reputation as a supplier of large quantities of high-quality drugs to "public service"[114] customers, the Hall trade was in a strong position, with its greatest profits during periods of military action.[115] Furthermore, the Society's dealings with these organisations, generally based on monopolies, fitted the mercantilist ethos prevalent at the time.[116]

The Society's image as the supplier of choice, initially for all of the drugs supplied to the Navy and later to the East India Company, was an important factor in establishing its reputation as a high-class pharmaceutical manufacturer. The monopolies awarded were a show of confidence in the Society's service and brought prestige to the trade. However,

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[113] G.M. Watson, "Some Eighteenth Century Trading Accounts", in F.N.L. Poynter (ed.), *The Evolution of Pharmacy in Britain,* 1965 (London, 1965), pp. 45-77; Porter and Porter (Corbyn), 1989; Tweedale, 1990.

[114] This term is frequently used by the Society to refer to customers that were related to government, such as the Navy and the Crown Agents, public institutions, such as hospitals, and also the East India Company. For example, in 1872 there were "delays in the execution of orders for the public service" which referred to the supply of drugs to the Army and India (T/3, Court of Proprietors and General Committee Minutes, 2 January 1872).

[115] For example, the Napoleonic Wars brought dividends of between seventy and eighty pounds per annum to the Navy Stock.

[116] Charles Wilson, *Mercantilism*, Historical Association Pamphlet No. 37 (London, 1958); Kristof Glamann, "European Trade 1500-1750", in C.M. Cipolla (ed.), *Fontana Economic History of Europe: the sixteenth and seventeenth centuries.* vol. 2 (Hassocks, 1977), pp. 177-272.

this was not the only reason why the Society built up a reputation for selling high-quality drugs.

A large part of the Society's reputation was based on its continuous history of drug supply since 1672. Whilst the eighteenth century saw the development of pharmaceutical manufacturing concerns such those belonging to the Corbyns and Bevans, when the laboratory was founded it had no equivalent. The establishment of a laboratory at the Hall at such an early date was an important part of the Society's reputation for quality. When analytical techniques for testing drugs were limited, a continuous history of reputable manufacturing and supply was the best indicator of quality. Nevertheless the Society rigorously employed the available methods to ensure that quality was guaranteed.

The Society's historical tradition of drug manufacture was boosted by its tripartite nature. Its livery company and medical corporation status validated its reputation for high-quality manufacture and supply. As the medically practising component of the Society's membership increased, the trade was seen as being directed by and being the supplier of medical men, confirming its respectability and reputation.

The impressive laboratory and notable chemists[117] at Apothecaries' Hall were further evidence of its status as a high-quality manufacturer, as their presence indicated that the best methods of drug preparation would be used. This was especially important when the pharmaceutical trade in Britain was fairly under-developed. An early description of the Hall laboratory refers to it as "the largest and the best"[118] and its reputation was maintained throughout the eighteenth and early-nineteenth centuries. For example, Josiah Wedgwood

[117] For example, Nicholas Staphorst and Peter Stahl, see p. 25.

[118] Quarrell and Mare, 1934, p. 111, quoting Zacharius Conrad von Uffenbach from 1710.

specifically wanted his new ceramic mortars to be tested at the Hall in 1779,[119] illustrating how approval by the Hall laboratory was regarded as an important endorsement, whilst details of laboratory procedures from the Hall appeared in pharmaceutical texts.[120]

Such references to the Hall laboratory as an example of good pharmaceutical practice boosted the Society's reputation as a pharmaceutical authority. The visitations of apothecary shops carried out by the College of Physicians and the Society added to this.[121] As the Society inspected the wares of others, it had to be seen to produce the best itself. The inspections of the Hall trade by the College Censors confirm this as the verdict "all things good" was frequently given,[122] whilst the "laboratory (was) in excellent order".[123] Further evidence of the Society's reputation for producing high-quality drugs came when the College asked for its assistance in the compilation of the *Pharmacopoeia Londinensis* in the late-eighteenth and early-nineteenth centuries.[124]

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[119] J.A. Chaldecott, "Wedgwood's Ceramic Wares for Chemical Use, Production and Supply from 1779-1794", *Ambix,* **27** (1981), pp. 184-205.

[120] For example, Jonathan Pereira, *Elements of Materia Medica and Therapeutics* (London, 1839-40), vol. 1, p. 365 (magnesia), p. 465 (calomel).

[121] Laurence Dopson, "State of London Chemists' Shops in the eighteenth and early nineteenth centuries", *Chemist and Druggist,* **163** (1955), pp. 718-21. However, by the nineteenth century, the brief visits, where only a few drugs could be examined and a fraction of shops visited, were condemned by some as an ineffective check on unqualified druggists and could be seen as detracting from the Society's reputation. See *The Lancet,* 2 March 1839, pp. 842-5.

[122] Royal College of Physicians, Censors' Visitations of Apothecaries' Shops, Royal College of Physicians Archive (hereafter cited as RCP Visitations), MS 2159, 9 June 1766; MS 2160, 4 July 1765; MS 2164, 24 June 1769; MS 2165, 20 June 1771.

[123] RCP Visitations, MS 2159, 9 June 1766.

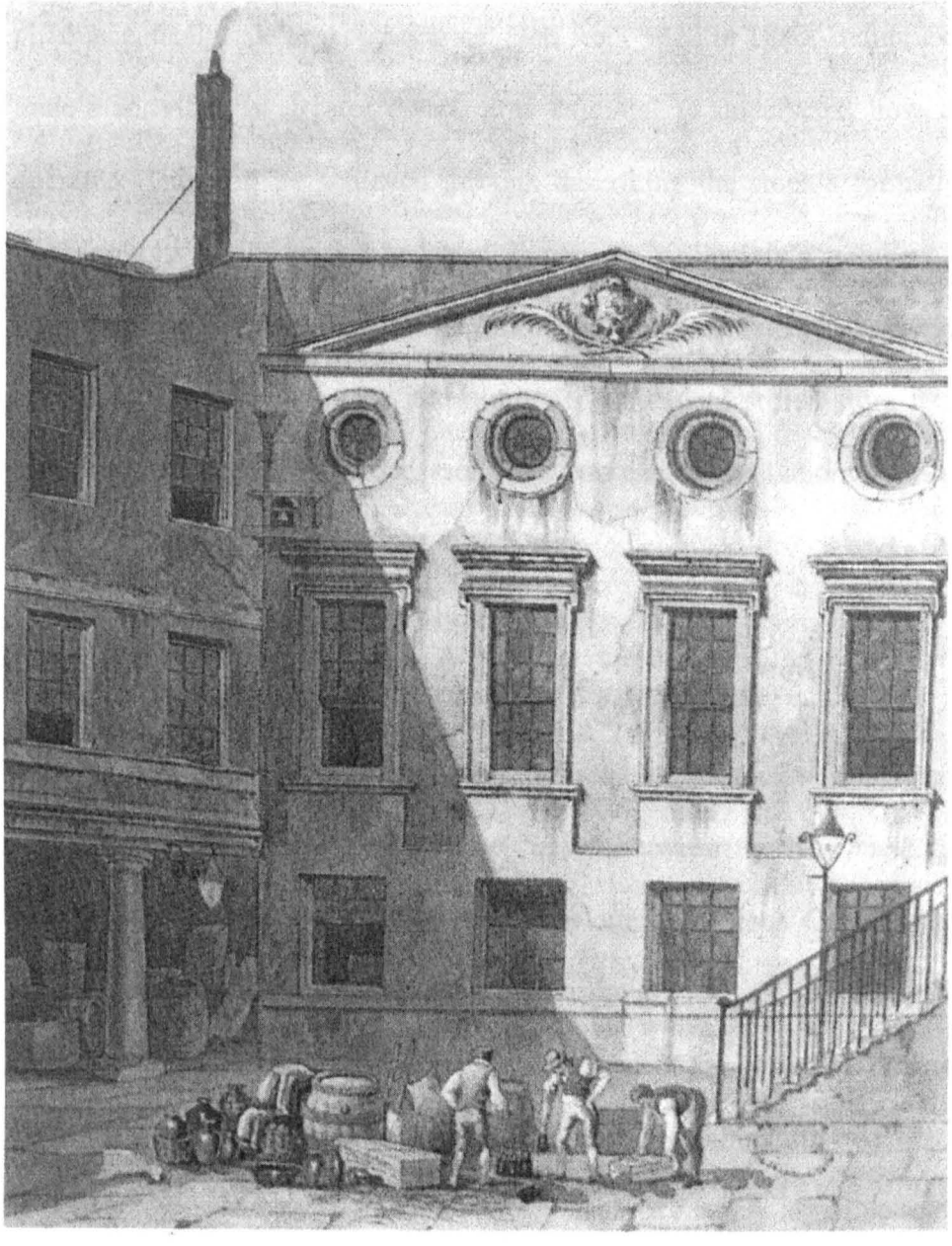
[124] Annals of the Royal College of Physicians, vol. 15, 17 March 1788, p. 175. For the Society's contribution to the *1809 Pharmacopoeia* see chapter three.

The Hall Trade in 1822

When the United Stock was founded in 1822, the Society's reputation as a high-quality drug manufacturer was well established. This had occurred not only by tradition, manufacturing standards, the chemists employed, the Society's pharmaceutical authority and its image as a drug supplier of choice, but also by the validation that its livery and licensing status provided. This makes the Society's reputation for quality an excellent example of how its three functions positively interacted to boost the Hall trade. However, as this chapter has shown, in many cases the unusual combination of activities that the Society pursued gave it an ambiguous status, whilst also defining its trading operation. Furthermore, although the United Stock was fortunate to inherit an unsurpassed reputation for the production and supply of quality drugs, it was impeded by the structural and administrative legacy of the Laboratory and Navy Stocks.

Although both the East India Company and the Navy were established customers of the Society in 1822 and its trade supplied apothecary shops, hospitals, government departments and medical men, the pharmaceutical marketplace in which the Laboratory and Navy Stocks had been created was changing. The Society's trade was based on monopolies with government or public institutions, and its approach to business fitted into the increasingly anachronistic mercantilist trade of the late-seventeenth and early-eighteenth centuries. Furthermore, competition in pharmaceutical manufacturing had increased, with firms that would be identifiable in the twentieth century, such as Allen and Hanburys, Howards and Sons, and Morsons, now established. These firms were introducing new techniques and products and increasing manufacturing capacity. They had good reputations and were not constrained in their commercial activities. However, the Hall trade, driven by a remit to produce quality drugs as a public service and holding valuable monopolies, was still in a favourable position, which the alterations made to the Laboratory and Navy Stocks in 1822 sought to strengthen.

The Courtyard of Apothecaries' Hall by George Shepherd, 1814



This is one of the few illustrations of Apothecaries' Hall showing evidence of trading activity. The four windows on the lowest level belonged to the main laboratory, which at this date was still situated underneath the Great Hall.

CHAPTER TWO

The United Stock, 1822-1880

The United Stock was the name given to the stock company that operated the pharmaceutical trade at Apothecaries' Hall from 1822 to 1880. Before examining the Hall trade's activities in greater detail, it is essential to understand how the United Stock operated. This will be achieved through describing the stock's formation and structure, examining its administration and management by the Society's members and discussing its trading departments and employees. Throughout this account one key feature emerges: the United Stock was a complex and outmoded operation, stifled from its inception by the century-old legacy of its predecessor stock companies, the Laboratory Stock and the Navy Stock.

The Formation and Structure of the United Stock

Following an initial proposal made by the Laboratory Stock at the Court of Assistants in March 1822, it was resolved that the "union between the Navy and Laboratory Stocks whereby their Trade would be conducted as one joint Stock Company may under proper Regulations become highly advantageous to the interests of both Stocks"[1]. Unfortunately, the Society's records do not state why the merger of the two stock companies appeared so favourable, but it seems likely that it arose from a combination of factors. Foremost were the economic reasons. Much of the work of the two stocks was interrelated and could be performed more cheaply by one stock company. When founded the stocks had had distinct roles in chemical and galenical medicine manufacture, but in time these overlapped making the employment of separate operators less essential. Economy was especially

[1] CM 26 March 1822.

important as the number of firms operating in the pharmaceutical marketplace was growing, whilst the end of hostilities with France caused the Navy Stock's profits to drop to a level comparable to the previously less profitable Laboratory Stock.[2]

However, it was not just financial economy that was important, so was economy of time. The demands of the Apothecaries Act of 1815 gave many of the Society's senior members additional responsibilities, so they had less time to participate in two separate committees for administering the stock companies. As there was a significant overlap between the Court of Assistants, the Court of Examiners and the managers of the stocks,[3] it seems that the Society's senior members wanted to streamline the trade's management. In addition to considerations of economy, the unification of the stocks appeared opportune because of the alterations to the trade that occurred in 1822. In this year, the Laboratory Stock acquired the lease of a foundry to house a new laboratory. This was the culmination of a period of improvement to the manufacturing premises at the Hall and was also an opportunity for rationalisation.

By comparison with other businesses, the United Stock had an elitist and outdated structure which made it quite unlike any other pharmaceutical firm or joint stock company. At this date most businesses were organised as partnerships or unincorporated companies because establishing a full corporation (a joint stock company with limited liability),

[2] T/2, Laboratory Stock Audit Book, 1803-22; United Stock Account Book, MS 8224 (hereafter cited as USAB) vol. 1, 1812-30, includes Navy Stock Balance, 1817-22. The best indication of the stocks' profitability comes from the yearly dividend paid to its proprietors.

[3] Of the twelve members of the Court of Examiners in 1822, nine sat on the Navy Stock Management Committee and nine on that for the Laboratory Stock, with seven sitting on both. Three of the Examiners held Treasurer posts in the stocks and five sat on the Court of Assistants, two being Wardens.

required the consent of Parliament or the Crown.[4] However, because of its livery background the Hall trade was allowed and inclined to be different from other firms.

To hold a share in the United Stock one had to be a member of the Society of Apothecaries. Each member could only purchase one share, which could not be transferred or sold. There were two classes of shares available: 120 first class shares had a value of £420 and could only be purchased by liverymen, and 220 second class shares had a value of £60 and were open to any yeoman in practice as an apothecary. The value of the shares could be altered according to the overall capital desired for the United Stock, but the ratio between their values was always maintained at seven to one. Promotion occurred from second to first class shares according to seniority within the Society, whilst vacancies in the second class were filled at the discretion of the General Committee of Managers.[5] Each proprietor received a dividend on his share in proportion to his investment and thus, as with the Navy Stock, the greatest profits from the trade were reserved for the Society's senior members. The discount on drugs purchased was the same for all proprietors, enabling them to benefit from savings made on the drugs they required for medical practice.

The United Stock existed, in the Society's terminology, as a co-partnership amongst its proprietors, with these proprietors administering the trade and receiving its profits. The co-partnership was created by a contract, signed by all of the proprietors, which specified the stock's purpose and management. However, unlike partnerships, whose individual members were liable for debts, the Society itself was responsible to any creditors of the

[4] P.L. Cottrell, *Industrial Finance, 1830-1914: The Finance and Organization of English Manufacturing Industry* (London, 1980), pp. 39-42.

[5] Information from Deed of Co-partnership, 1822, MS 8217 (hereafter cited as Deed, 1822); Underwood, pp. 160-1.

United Stock. By its charter of 1617 the Society was empowered to buy and sell and it gave this legal sanction to the United Stock's proprietors.[6] The proprietors thus carried out the trade in the Society's name and on its premises, although property dealings were generally undertaken by the Society corporately. As the Society's future would have been threatened if the stock had accrued large debts, it was essential that it retained control over the trade's activities. The Court of Assistants could thus veto decisions taken by the proprietors, choose the treasurers and approve the stock's bankers, whilst the Master directly received any money from the Navy.[7] The Court's influence was significant because it consisted of the Society's most senior members, who generally had a conservative approach to the trade's management and were resistant to change.

The rules for governing the United Stock and its management structure were laid down in the Deed of Co-partnership, signed on 9 November 1822.[8] This dissolved the Laboratory and Navy Stocks and transferred the trading businesses to the proprietors of the United Stock. The importance of the Deed cannot be overstated. It not only confirmed the continuance of the Court of Assistant's authority, but also set up a core administrative structure. In the opinion of the leaders of the Society, the Deed could not be deviated from whilst the United Stock existed, making many subsequent proposals to improve the stock's profitability appear impossible to implement. In addition to fixing a structure for the

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[6] However, unlike in many corporations (Cottrell, p. 40), proprietors of the United Stock could not freely transfer shares.

[7] "Observations of Mr Treasurer Field on the relative position of the Corporation and the United Stock, 1835" contained in George Makins' Private Notebook (hereafter cited as Makins' Notebook), pp. 136-7. This was compiled in the late 1870s by a member of the Managing Committee, who, when trying to improve the trade, made notes of the United Stock's activities.

[8] SCA 9 November 1822. As the deed was signed in 1822 and the first management committee and treasurers elected then, I have taken this as the year of the United Stock's formation. Some histories of the Society use 1823, the first year when the United Stock was fully operational.

United Stock, the Deed also tied it to terms of financial practice that were rooted in the previous century. The restrictions on share-ownership and ultimate control for the Court of Assistants meant that the United Stock could not function as a commercial concern, but only under the auspices of the Society as a livery company. Meanwhile, the similarities between the terms of the Deed and the various articles of the Laboratory and Navy Stocks are striking. The discounts given on bills settled by 25 March each year remained, as did all the committees and appointments. Although a new stock company had been formed, the operation of the pharmaceutical trade at the Hall was relatively unaffected.

The Management of the United Stock

The management structure of the United Stock was a major influence on its operations and the reason why the trade continued to be administered as it had been during the Laboratory and Navy Stocks. On the first Saturday in December, all United Stock proprietors could attend the annual General Court of Proprietors (the GCP). The Court's purpose was to elect a General Committee of Managers (the GCM) and to appoint auditors. Although its approval was required for any major decisions affecting the United Stock, the GCP had little impact on the actual administration of the trade. Only first class proprietors could be chosen as managers and all of the GCP's appointments were subject to the formal approval of the Court of Assistants. In denying second class proprietors any role in management, the elitist character of the United Stock was confirmed and certain members were alienated from the Hall trade. This was in contrast to how from 1672 there had been provision for yeoman proprietors to be represented on the laboratory's management committee. This omission would later manifest itself in the declining support from the yeomanry for the United Stock.

The GCM was larger than the management committees of the Laboratory and Navy Stocks and consisted of thirty first class proprietors, plus the Master and Wardens. It was

responsible for administering the United Stock, with the power to elect and discharge senior employees and to raise salaries and award bonuses. It met quarterly and its members were paid a fee for attendance. The GCM generally consisted of the most senior members of the Society, that is the Court of Assistants and those about to succeed to it. In 1822 ten members of the Court of Assistants were elected to the GCM and, although this number fluctuated, the GCM's outlook reflected the conservative approach of the Court of Assistants and the leaders of the Society throughout the whole of the period.

The influence of the auditors, although they were also liverymen, was slightly different. Initially nine auditors were appointed and their role was to annually prepare a report for the GCM on the fortunes of the stock and the dividends to be paid to proprietors. Only two members of the GCM could be auditors and the group as a whole was made up of less senior liverymen than those on the GCM. Although it would be an exaggeration to state that the auditors acted as a check on the GCM's activities, they did occasionally give advice, which at least provided the GCM with an alternative outlook.[9]

The key posts on the GCM were the treasurer and two deputy treasurers. This continued a role that had begun when the laboratory was founded in 1672 and ensured that the prime managerial responsibility for the Hall trade remained with an apothecary. The treasurer was effectively the General Manager of the trade, as well as its public representative and he was paid an honorarium that reflected these responsibilities. Even though the post was

[9] For example, in 1830, the auditors prepared a special report on the drop in turnover and made recommendations for cutting costs (GCM 6 March 1830). All minutes of the GCM and GCP will be cited in this way. They are contained in three volumes of the Minute Book of the Court and General Meetings of the Proprietors of the United Stock, the special sub-committee of the United Stock and the various committees of Managers, MS 8223, vol. 1 1823-38, vol. 2 1838-50, vol. 3 1851-67 and T/3, Court of Proprietors and General Committee Minute Book, 1867-81.

not full-time, as its occupants continued in medical practice, in 1823 the treasurer's salary of 300 guineas paid was greater than that of any of the trade's employees.[10]

The work of the treasurer and deputy treasurers remained much the same as during the Laboratory and Navy Stocks. They examined accounts, paid bills and dividends, and reported on the trade to the Court of Assistants every quarter. They also had a crucial role in the general superintendence of the business, issuing directions to the various departments involved in the operations of the trade. The responsibilities that went with the post meant that the Court of Assistants made the appointment, rather than the GCM, ensuring that the candidate was "well-qualified by education, respectability, habits of life and the knowledge of the business of the stock".[11] The occupants of the three treasurer posts in 1822[12] all possessed these attributes and had held similar positions in the Navy and Laboratory Stocks, reflecting the continuation of the management personnel as well as the management structure. The role of the treasurer remained relatively unchanged during the United Stock but with the trade's income declining, the second deputy treasurer post was abolished in 1833, whilst the salary of the treasurer was also reduced.[13] However, the fact that an apothecary continued to occupy a post that carried so much influence increasingly proved detrimental to the trade.

The GCM appointed four sub-committees for buying, inspection, pricing and accounts to manage the Hall trade on a day-to-day basis. The sub-committees also prepared reports on

[10] GCM 6 December 1823. His deputies were paid 100 and 200 guineas.

[11] Quote from "Observations of Mr Treasurer Field", Makins' Notebook, pp. 137-8.

[12] William Simons was treasurer, whilst Edward Browne and Henry Field were deputy treasurers. For biographies see Appendix B.

[13] GCM 2 March 1833. In 1827 the treasurer's salary was 200 guineas (GCP 1 December 1827), but by 1872 it was only 100 guineas (GCM 2 March 1872).

the trade, from which the GCM decided on wider policy. The sub-committee structure was another legacy from the past. The Navy Stock had sub-committees for buying, inspection and pricing,[14] but after 1822 an even more involved system was set up, with additional committees of more members.

The treasurer was automatically the chair of the most important of the trade's sub-committees, the sub-committee of buying, which consisted of fifteen members. Each week it reviewed the orders received and dispatched, and purchased any drugs required. It was responsible for official United Stock correspondence and for the wages, hiring and firing of the majority of the employees. Ultimately it had control of the general running of the trade, being required "generally to manage and carry on all such parts of the co-partnership business which are not herein reserved for the General Committee of Managers or delegated to other sub-committees".[15]

The sub-committee for inspection had seven members, was chaired by the deputy treasurer and controlled drug quality. Using the senses and limited chemical tests, it examined all of the medicines and chemicals prepared in the Hall's laboratories, reporting back to the operators on quality. It also inspected all purchased drugs to ensure that the quality and quantity matched the buying committee's orders. The sub-committee for pricing consisted of seven members, who met to ascertain the cost price of every article "by a new and correct valuation of the direct and indirect charges attending the same".[16] Once prices were established, it was the committee's responsibility to alter them as required, depending on the cost of raw materials and labour.

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[14] CM 27 November 1766.

[15] GCM 1 January 1823. All of the information on the different roles of the various sub-committees comes from this GCM and from Makins' Notebook, pp. 177-81.

[16] GCM 1 January 1823.

The final sub-committee was that of accounts. It had seven members, was chaired by the Senior Warden and examined all the ledgers and order books kept by the different departments of the business. It also checked invoices, with at least three members' signatures required before the treasurers authorised payment. Whilst this ensured honesty, it was laborious and inefficient. Together the four sub-committees supervised all of the trade's operations, with their meetings held on different days to keep a constant check on the employees. One or more members of the committee would examine the "various laboratories, mill house etc, making minutes of the same"[17] and when no meeting took place the treasurers performed this role.

This committee structure basically remained in place throughout the lifetime of the United Stock. However, the fees for the numerous committee members were expensive and after losing the Navy contract in 1823 there were reductions in numbers.[18] The most important change came in 1839 following a report by the treasurer and deputy treasurer on how to reduce the trade's operating expenses.[19] As was typical of the Society, a committee was set up to investigate the report, adding another step to the management process. The buying committee was reduced to seven, whilst the pricing committee was discontinued, with its duties instead performed by the treasurer and deputy treasurer.[20]

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[17] GCM 1 January 1823.

[18] By 1825 the smaller committees were reduced to five members, whilst the buying committee had decreased to eleven. After the auditors stressed the importance of economising in 1830, the pricing, accounts and inspection committees were confirmed at five members and only six auditors were appointed (Special GCP 16 October 1830, GCM 1 January 1831), whilst the buying committee was reduced to ten members.

[19] GCM 1 September 1838, 1 January 1839.

[20] Unlike the GCM, treasurers and auditors, although provision for the appointment of sub-committees was made in the Deed, their number and nature was not specified. Therefore changes could be made, as long as the committees did not consist of fewer than five persons (Deed, 1822).

Despite these changes the reduction in expenditure was minimal,[21] as the burdensome committee structure of the United Stock remained intact. Simply administering the trade by committee was time-consuming and disregarded the desire for economy of both time and money that had prompted the Stock's formation. The trade's laborious decision-making processes are illustrated by the buying committee's method of selecting drugs for purchase. The articles and quantities required were posted on a list at Apothecaries' Hall for the information of any merchant or druggist who wished to provide samples for inspection and these were then placed before the buying committee. The best quality sample was chosen without prior knowledge of supplier or price, so an impartial decision was made. If the quality of the samples was the same, the sample with the lower price was taken. If these factors were equal and large quantities of the drug were required, the order was split or given to the firm from which the least was purchased.[22]

This complex process was apparently unique within the pharmaceutical industry and illustrated how the Society believed it was a privilege to supply its trade. The implementation of such a method showed the importance that the Society placed on drug quality, whilst the fact that the procedure was explained in the booklet published about the trade in 1823 illustrated how the method was a crucial element in maintaining the Society's reputation. However, the history of Allen and Hanburys shows that they could guarantee quality by simpler processes, relying on a highly competitive buying policy[23]

[21] Only £40 less was spent on committee expenses in 1839 than in 1838 (USAB, vol. 2, 1831-1846).

[22] 1823 Booklet, p. 10.

[23] S.S. Stander, "A History of the Pharmaceutical Industry with particular reference to Allen and Hanbury, 1775-1843", MSc Thesis, London University, 1965, p. 70.

and the reputability of the Quaker networks within which they operated.[24] Compared to this, the Hall's method not only appeared laborious, but also inefficient and almost eccentric.

The method of drug purchasing is one example of the profound implications that the structure of the United Stock, as set up in 1822, had on the actual operation of the Hall trade and many more will be highlighted in the following chapters. The numerous committees and layers of authority lengthened administrative procedures, sometimes to the extent that no decisions were ever made, whilst management by committee was expensive. As the Deed of Co-partnership of 1822 tied the United Stock to the financial and managerial practices of the Laboratory and Navy Stocks, it is not surprising that the trade continued to be mercantilist and monopolistic. Whilst in the eighteenth century this situation was normal, it would be a serious handicap in the nineteenth.

The Departments of the Trade and their Employees

Whilst the GCM, treasurers and various sub-committees directed the management of the United Stock, the day to day functioning of the trade depended on the actions of the employees and the departmental structure within which they worked. The trade's departmental structure was in many respects as complex and laborious as its management structure. Whilst the trade's efficient management was impeded by the numerous committees of apothecaries administering it, the outdated working practices of the trade's employees, their reluctance to change, established familial succession and certain employment practices were equally influential in contributing to the trade's out-moded

[24] For example William Allen persuaded his nephew Stafford Allen to set up drug mills in 1833 to obtain a supply of unadulterated drugs. Margaret Stiles, "The Quakers in Pharmacy", in F.N.L. Poynter, 1965, pp. 113-30: Arthur Raistrack, *Quakers in Science and Industry* (Newton Abbot, 1968).

existence. Before looking at the characteristics of the various departments in more detail, it is important to consider their different functions and employees.

The Wholesale Trade

The wholesale trade was responsible for dealing with all of the large orders of drugs that the Hall received, primarily from government and public service customers. Its work was carried out by several departments: the warehouse or wholesale department, the storekeeper's department and the packing department. Drugs obtained from the Hall laboratory or outside suppliers were sent to the storekeeper's department where they were kept until needed. Orders were received in the warehouse, the centre of the wholesale department. The drugs required would be sent there from the stores and made up into the formulation (e.g. pills, liquid etc) requested by the customer. Finally, the drugs were sent back to the packing department to be packed and despatched. This operation was complicated by the fact that each department occupied a distinct space in a different part of the Hall's trading premises.[25] Although a drop in the number of employees occurred during the period 1822 to 1880, the only complete data on staffing levels at the Hall comes from the 1870s.[26] In the wholesale department during the 1870s, eight or nine men were employed: three assistants or officers (the Society's term for describing senior trade employees paid a monthly salary) and five or six porters. In the storeroom there were a further two porters, along with the head of the store and warehouse, whilst in packing there was a head packing clerk and three packers.

[25] See plan of Hall p. 62, showing location of store and wholesale warehouse.

[26] Makins' Notebook, pp. 61-6, includes a list of the assistants in 1872 and 1874 and an employee list from 1877, updated in 1878 and 1879. However, it is sometimes unclear who was actually employed due to the corrections made.

The Proprietors' Department

The proprietors' department was small, with only three members of staff in the 1870s. It could also be viewed as part of the wholesale trade at the Hall, as it dealt with all of the orders from the United Stock's proprietors. This included the supply of drugs in bulk quantities to apothecaries working in hospitals and dispensaries.[27] The functions of this department also overlapped with the retail trade as it supplied individual medical practitioners, reflecting the tendency of the Hall trade to duplicate operations. A proprietor could purchase drugs from the wholesale or proprietors' department, if they were for use at the institution where he was employed, or from the proprietors' department or retail, if they were required in smaller quantities for his patients.

The Retail Department

The retail and prescription department was treated separately from the rest of the Hall trade by the GCM due to its function to provide only small quantities of drugs to members of the public and medical practitioners. Its clientele were the middle and upper classes of society, the only ones that could afford its prices. The retail department performed the usual pharmacy functions of dispensing prescriptions and making up medicinal preparations according to a customer's requirements and although it did not sell patent medicines or chemists' sundries it sold the Hall's small range of specially formulated preparations. The department had a large staff which in 1877 numbered ten, including the superintendent.[28] Five assistants and a clerk were employed, by this date all qualified as members of the Pharmaceutical Society. Three porters were also employed.[29]

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[27] GCM 5 June 1852.

[28] The post had previously been called Accountant to Retail or Retail Department Head.

[29] Makins' Notebook, pp. 61-6.

From 1823 the retail department operated from premises in the north-west corner of the courtyard at Apothecaries' Hall. It consisted of a large retail shop, a prescription room and infusion room, with a separate retail entrance on Water Lane.[30] A shop existed at the Hall from the beginning of the laboratory in 1672 to sell the chemical medicines made there, but it is unclear whether its customers included the general public. However, a retail trade did exist at the Hall prior to 1822, as on the amalgamation of the Laboratory and Navy Stocks it was decided that it would undergo a similar unification, with the retail department to be carried on from one shop with one warehouse, in contrast to the separate chemical and galenical concerns that previously existed.[31]

The Laboratory

The largest department in the Hall trade was the laboratory, which during the 1870s was staffed by a chemical operator, foreman, about eight workmen and an "engine driver" responsible for the power supply to the trade. As the central themes of this thesis are the chemical and pharmaceutical activities at the Hall, the laboratory employees are discussed at length in later chapters. It is sufficient here to note that the head employee (once the galenical operator post was abolished in 1826) was the chemical operator and in addition to this a superintending chemical operator was employed from 1812 to 1866, subsequently replaced by a laboratory inspectorate post.

The Accountant's Department

In 1823, the accountant's department, or counting house, was under the direction of Thomas Morpeth, assisted by four clerks. The importance of the accountant to the trade was reflected in his salary, which was only slightly less than that of the chemical operator. His duties were numerous, covering all aspects of the trade except the retail department,

[30] GCM 10 June 1823. Layout from Ground Plan of Apothecaries' Hall, 1874.

[31] GCM 1 January 1823.

which until 1880 managed its own accounts. The accountant was responsible for collecting debts from the majority of customers, keeping accounts of the trade's income and expenditure and preparing the books for the annual audit. He additionally had a role as a secretary and administrator dealing with all the letters, orders and bills for the United Stock, consulting the treasurer if necessary. Finally he supervised the clerks in the counting house and reported any misconduct to the treasurers.[32] Although no definition is given of the clerks' work, as the head of the department had such extensive responsibilities, it seems likely that much of the routine book-keeping and order work was performed by his assistants.

The Trade's Total Workforce

The number of men employed by the trade made it the largest pharmaceutical operation in London in 1822. As described by Geoffrey Tweedale, in the early nineteenth century, a typical London chemist and druggist was a small-scale concern. The business was run by the partners and a clerk, assisted by a couple of warehousemen and dispensers,[33] whilst many firms employed a few laboratory staff as well. By comparison, there were twenty-six assistants employed by the Hall trade in 1823, and whilst no records exist as to the number of workmen employed (the Society's term for manual workers paid a weekly wage), it seems likely that in the first decade of the United Stock the total number of employees was between fifty and sixty. It appears that no redundancies were made following the unification of the two stocks, but following the auditors' report of 1830, which argued for

[32] GCM 3 June 1827.

[33] Geoffrey Tweedale, "Archives of the Pharmaceutical Industry: their scope and use", in Lesley Richmond, Julie Stevenson and Alison Turton (eds.), *The Pharmaceutical Industry – a guide to historical records* (Aldershot, 2003), pp. 33-48.

"economy in all departments" the GCM took steps to cut staff numbers.[34] By 1846 there were only seventeen assistants employed in the trade and this reduction in staff numbers appears to have occurred equally amongst the workmen.[35] In 1877 the total number employed was forty-five,[36] with twenty assistants and twenty-five workmen. However, the Hall's position as the largest employer in the London pharmaceutical trade was changing. Howards and Sons of Stratford, a fine chemical manufacturer and rival supplier of government departments, had similar total salary and wage costs as the Society in 1856.[37] However, by 1870 Howards' expenditure in this area was more than double that at the Hall.[38] Whilst the Society was gradually reducing its number of employees, its competitors were expanding,[39] reflecting the lack of development to the Hall's pharmaceutical trade.

Characteristics of the Hall Trading Departments

Whilst the overall trend to reduce the size of the Hall's workforce reflected a lack of development of the trade, much more can be ascertained about its operation from the characteristics exhibited by its various trading departments. As a result of the Society's

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[34] Quote from GCM 6 March 1830. The trading expenses dropped from £5,368 in 1830 to £4,970 in 1831, primarily due to savings made on salaries and wages (USAB, vol. 2).

[35] Salaries Receipt Book, 1823-46, MS 8259. In 1829, the first year data exists for, £2,387 was spent on salaries for 10 officers, plus clerks and shopmen and £2,253 on wages for labourers, porters and others. In 1846 the cost of salaries stood at £2,143 and that for wages £1,670 (USAB vols. 1 and 2).

[36] Makins' Notebook, pp. 63-6.

[37] The Society's total salary and wage bill was £4,212 compared to £4,233 at Howards (excluding pensions and other additional payments). USAB vol. 3 (1846-59); Howards and Sons, Laboratory Calculations Book, includes data on wages, 1856,.1860-1888, Redbridge Local Studies and Archives Service.

[38] In 1870 the Hall spent £4,852 on salaries, wages and pensions (USAB vol. 4, 1860-78) compared to £10,668 by Howards.

[39] At Allen and Hanburys in 1868 seventeen or eighteen men, in addition to the owner, were employed. When new premises opened in 1872 there were thirty employees (Tweedale, 1990, p. 72).

attitude towards its employees, certain working practices flourished that were detrimental to the trade's operation.

As the numerous sub-committees duplicated responsibilities and tasks, so did the Hall's trading departments. Considering the wholesale trade in 1823, each of the three departments had a separate head,[40] with a tendency towards autonomy rather than co-operation. The GCM did recognise some of the problems in the wholesale trade and stressed the importance of "more direct communication with committees" and "greater consolidation and better supervision of the warehouse, store and packing departments" when carrying out reviews of the trading departments.[41]

However, whilst suggestions on how to improve the trade were made fairly frequently, this did not lead to action being taken. In 1852 alterations to consolidate business in the warehouse, packing room and proprietary shop were proposed. It was suggested that the proprietors' department should be split into two portions, amalgamating the work for hospitals and dispensaries with the warehouse and that for medical practitioners with retail[42] in an attempt to simplify the system that existed. Despite a decision that the changes should be implemented, the proprietors' department remained in existence throughout the duration of the United Stock, maintaining the duplication of activities.

The nature of employment at the Hall created further difficulties. Many of the trade's employees were trained on the job and spent their entire working life at the Hall. For example in the Accountant's Department, clerks typically worked there for many years

[40] By 1852 this had changed, with Thomas Buss in charge of the store and warehouse, although the departments retained distinct staffs.

[41] GCM 5 June 1852.

[42] GCM 5 June 1852.

before eventually reaching the head post.[43] This established line of succession meant that identical business practices were passed on from one accountant to the next, something that served only to perpetuate the outdated operations of the trade. In many respects the trade's employees were as conservative as its management. Although a switch to the then widespread practice of double entry book-keeping was first proposed in 1867, and reiterated in 1891, it did not occur until 1914.[44] As both the trade's management and its employees were happy with the current system they felt no need to change it.

The Hall was remarkable for the long service of its employees. Prior to the reorganisation in 1880, sixty-three percent of staff had been employed for ten years or more and thirty-two percent had served for twenty-five years or more, something that was reflected in the fact that the same percentage was over fifty years old.[45] Thomas Tingle Junior, who became head of the retail department in 1841, had worked at the Hall during his apprenticeship as an apothecary. On gaining his freedom in 1823 he was employed in the trade and served the Society until he retired in 1881, aged seventy-nine. While this loyalty was commendable, it did have disadvantages, especially as the Society's paternalistic attitude towards its employees meant that it would very rarely dispense with someone's services. The appointment of employees by an established line of succession caused problems for the trade. Despite Tingle Junior's long service, his management skills were lacking and he was often criticised for supervising his department poorly. In 1853 he had to "again be warned of the absolute necessity for a greater amount of vigilance and

[43] For example the accountants James Chabot and Frederick Alderson.

[44] GCM 2 March 1867; MCM 24 March 1891; E/7 Loose Papers, Box 5, Reports following Evans, Fripp, Deed and Co. Investigation into the Trade, 1914. MCM refers to Management Committee Minutes, found in T/24 to T/34, covering 1881-1922. For information on developments in accountancy see Sidney Pollard, *The Genesis of Modern Management: A Study of the Industrial Revolution in Great Britain* (London, 1965), chapter six.

[45] Information from salary list before reorganisation, 1880 (E/7 Loose Papers, Box 6).

attention on his part"[46] and it seems likely that the Society was relieved to have the excuse of the 1880 reorganisation to offer him retirement.[47]

Tingle Junior provides an example of another characteristic of the trading departments at the Hall: the running of a department by one family. Between them, Thomas and his father were in charge of the retail department for almost the entirety of the United Stock. Similarly the accountant's department was dominated by the Morpeth family, with Thomas, Edward Senior, Edward Junior and William putting in 163 years of service and between them holding the position of accountant for sixty-three years during the period 1822-1922. The resistance to change, conservatism and inability to retire staff that came with such familial dominance of a department only served to increase the trade's backward nature.

The Society's employment practices did have positive aspects. The employment of members of the same family occurred throughout the trade, giving the impression that the Society could always find a position for a close relative of a long-standing employee.[48] The Society's paternalistic attitude towards its employees extended to pensions for long serving employees, assistance in times of hardship and free medicines, whilst some employees lived in accommodation at the Hall. This paternalism was typical of many family firms at

[46] GCM 4 June 1853.

[47] CM 28 June 1881.

[48] Brothers Frederick and George Alderson worked in the accountant's office; Charles Rivers was Henry Hennell's assistant and later Bedel, whilst his son Henry worked in retail; Philip Reilly worked in the Proprietary Department, as did his son William (Details from GCM).

the time,[49] and frequently the advantages and disadvantages of this type of business[50] are similar to those of the Hall trade.

Although one can interpret the long service of numerous employees as resulting from loyalty and the Society's paternalistic attitudes, a further explanation is also required. As I have already mentioned, the Society found it very difficult to retire employees, something that also applied to disciplining[51] or firing them. Despite apparent ineptitude, employees remained in their positions[52] and it has only been possible to find one reference to a trade employee being fired due to poor conduct in the period 1822 to 1922.[53] Unfortunately for the Society, the dismissal prompted the employee, William Hendrie, to start a campaign denouncing the Society and the publicity generated when his accusations led to libel proceedings was relished by the trade journal *The Chemist and Druggist*.[54]

When this picture of the Hall trading departments is combined with the difficulties caused by the United Stock's structure and management system, one is tempted to think that the

[49] This applies to both small family firms and those such as Lever, Rowntree and Cadbury, although the Society's provision of accommodation only stretched to its own property around Apothecaries' Hall. Patrick Joyce, *Work, Society and Politics: The Culture of the Factory in Later Victorian England* (Hassocks, 1980).

[50] Mary Rose, "The Family Firm in British Business, 1780-1914", in Maurice Kirby and Mary Rose (eds.), *Business Enterprise in Modern Britain* (London, 1994), pp. 61-89; Andrea Colli, *The History of Family Business, 1850-2000* (Cambridge, 2003).

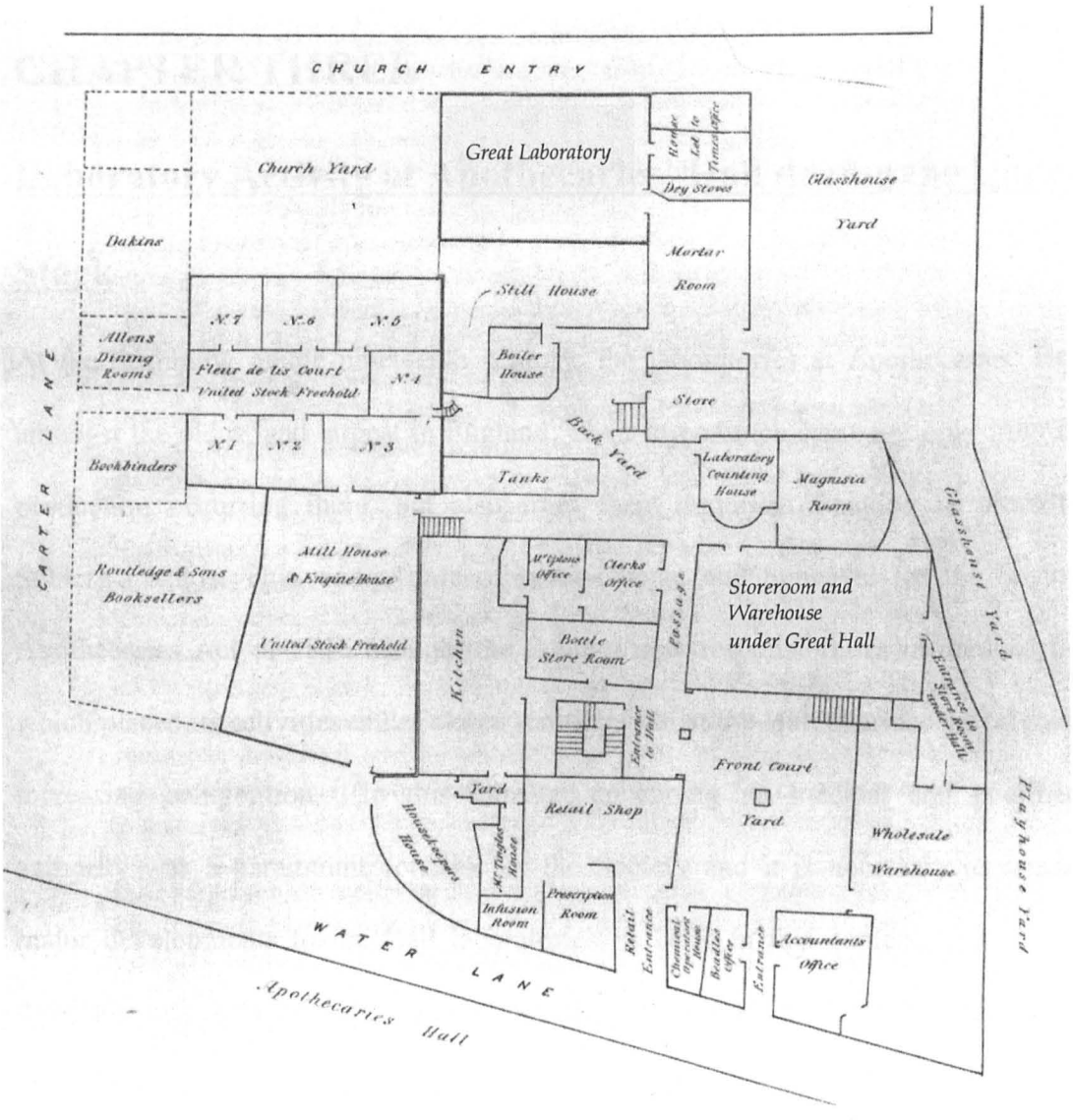
[51] Tingle and his assistants in retail were warned about "general negligence in the department" (GCM 2 March 1844) but the problems still continued (see pp. 58-59).

[52] W. Thorpe, the engine driver, had an "unfortunate occurrence" with the gas engine in 1903. He was severely reprimanded and told to pay better attention to his work otherwise he would be dismissed (MCM 3 February 1903). In 1908 he was reprimanded for "impertinence and insubordination" (MCM 30 June 1908), but despite this his employment continued.

[53] MCM 12 January 1892.

[54] *Chemist and Druggist*, **65** (1904), pp. 599-600, **83** (1913), p. 903, **84** (1914), p. 482 and p. 621.

United Stock was doomed from its start. Although the United Stock was odd and outdated, its management systems laborious and inefficient, and many of its employees at best old-fashioned and at worst incompetent, the trade continued to operate for as long as it fulfilled the Society's aims. This on-going support was partly due to the trade's prestigious laboratories and chemists, as they made a significant contribution to the Society's status.



Ground Plan of the Hall and Trade Premises during the United Stock

This has been adapted from a plan of the United Stock premises from c. 1880.

CHAPTER THREE

Laboratory Activity at Apothecaries' Hall during the United Stock

At the beginning of the nineteenth century, the laboratories at Apothecaries' Hall were amongst the oldest and largest in England. Their importance came not only from the drug production occurring there, but also from their rhetorical function in promoting the Society's status. This was a time of great change and upheaval for the Society. The Apothecaries Act of 1815 brought the Society new responsibilities in medical licensing which placed its activities under closer scrutiny, whilst the Hall pharmaceutical trade faced increasing competition. In this climate, enhancing its medical and pharmaceutical authority was a paramount concern for the Society and it is necessary to re-assess the major developments to the Hall laboratories in 1822 in this context. Not only did the developments coincide with the reorganisation of the trade to form the United Stock, but they also occurred soon after the Society began its new licensing role.

Background to the 1822 Developments

From the beginning of drug production at Apothecaries' Hall manufacturing was not only confined to the laboratory under the Great Hall.[1] A pattern of incremental expansion into the land surrounding the Hall characterised the trade's subsequent development. The growth of the Navy Stock's customer base, as discussed in chapter one, brought an increased demand for Hall drugs. Consequently the Hall trade required more extensive manufacturing and warehousing premises, so new Laboratory Stock and Navy Stock

[1] This is illustrated by the complaints regarding the burning of sulphur in the Hall's kitchen (CM 8 December 1677).

premises were completed by February 1782 in Playhouse and Glasshouse Yards.[2] The main laboratory was still located under the Great Hall, but there was now a still house, magnesia laboratory, laboratory for salts and a new chemical laboratory on land at the rear (east) of the Hall, along with a mortar house, warehouse accommodation and housing for employees.[3]

In the eighteenth century the Society was expanding its manufacturing capacity on the edges of industrial London, close to the wharves along the river Thames, so the development was suited to the area.[4] The Society's premises were quite a contrast to the laboratory facilities available to other drug producers, as shop based manufacturing was typical of the trade at this time. For example, in 1761 the London druggist William Jones supplied hospitals and institutions throughout the country from a laboratory behind his shop.[5] By comparison, there were around 1,500 square feet in the main laboratory under the Great Hall, a manufacturing capacity that was increased after the extensions of 1782.

Given the external demand, these developments were also inadequate and the laboratories underwent a period of incremental growth to increase capacity. The mainstay of the Society's trade was its supply to the Navy and East India Company. These customers both required large quantities of traditional drugs and the alterations at the Hall reflected their needs. In 1801 a mill house and an engine house were built in Water Lane to enable large quantities of drugs to be ground on site and laboratory development later occurred in

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[2] CM 26 February 1782.

[3] It is difficult to be certain of the exact layout and chronology of the development (especially for the magnesia house). Hunting, 1998, pp. 93-8; Property Papers and Deeds from MS 8263, 8265, 8269 and E/7 Loose Papers, Box 6; Building Committee Minutes, MS 8232, vol. 1, 1781-5.

[4] George Rudé, *Hanoverian London 1714-1808* (London, 1971).

[5] Holloway, 1991, p. 39.

Glasshouse Yard.[6] The Society also leased property in Holborn in 1808 to manufacture Glauber's salts (the purgative sodium sulphate).[7]

The developments were not only about increasing capacity but also about maintaining high-quality production and the reputation of the Society's laboratories. In 1814 a state of the art steam house and associated apparatus costing £1,131 was added to the Hall laboratories. This was a great source of pride for the Society who invited "suitable persons" to view the finished project in 1815.[8] Chemical laboratories had generally relied on naked flames or sand baths as sources of heat, but the 1815 revision of the *Pharmacopoeia Londinensis* of 1809 encouraged further use of the water bath. The Society's new apparatus was a scaled up version of this, with the *Pharmacopoeia* noting, "steam is now applied to this purpose upon a large scale at Apothecaries' Hall".[9] In keeping abreast of developments in chemical manufacturing the Society demonstrated the importance it placed on producing high-quality products.

In the years leading up to 1822 the importance of expanding capacity, encompassing developments in manufacturing and ensuring the production of quality drugs, lay behind the alterations to the Hall trade. These motivations are equally applicable to the improvements to the laboratories that occurred in 1822. These developments coincided with the reorganisation of the Hall trade and the formation of the United Stock, with the

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[6] Property Papers and Deeds, MS 8269; CM 23 October 1801; T/2, Laboratory Stock Audit Book, 1803-22.

[7] Property Papers and Deeds, MS 8269. The lease only lasted until 1831, after which date it appears that the Society purchased the drug from wholesalers.

[8] CM 30 March 1815.

[9] *The Pharmacopoeia of the Royal College of Physicians of London, 1809,* translated into English with notes by Richard Powell (London, 1815), (hereafter cited as Pharmacopoeia, 1815), pp. 11, 222-4 and plate at rear. Quoted in J.C. Hanbury, "Early Developments in the Fine Chemical Industry – An Historical Survey", *Chemistry and Industry,* 15 April 1952, pp. 300-7.

objectives of consolidating and improving the trade's operation important motivations for both. However, unlike in 1672 when the Society's reasons for establishing a laboratory were included in the orders governing it, in 1822 the Society did not explicitly state its motivations for the developments.

Government and overseas drug supply was extremely important to the Hall pharmaceutical trade, both in terms of the income generated and the Society's public service mandate. In 1822 the Hall trade was still the primary supplier of the East India Company and Navy, so it was important to maintain extensive facilities for bulk manufacture. Additionally, in 1810 the Society had been informed that the Army would purchase future medical supplies from the Hall.[10] Although no agreement was reached due to the continued presence of the apothecary general George Garnier,[11] his illness in 1819 led negotiations to resume.[12] With the prospect of obtaining such an important contract it seems likely that the Society wanted to expand its manufacturing capacity to cope with the anticipated increase in demand.

The main laboratory's unsuitable location under the Great Hall was a further reason for constructing a replacement at the rear of the premises. Although the developments of 1782 had enabled some manufacturing to move away from under the Great Hall, drug production still occurred there.[13] The close proximity of manufacturing to the location for the Society's ceremonial and dining activities was hardly ideal, especially when production

[10] SCA 8 October 1810.

[11] The apothecary general controlled all medical supplies to the Army. Although the post was theoretically abolished in 1810, Garnier was in possession of a patent that had been granted to his predecessors to hold the post in perpetuity. Neil Cantlie, *A History of the Army Medical Department,* vol. 1 (Edinburgh, 1974), p. 61, p. 187, p. 202.

[12] E/7 Loose Papers, Box 4, Letters re drug supply to the Army 1819-21; SCA 2 December 1819.

[13] A description of Apothecaries' Hall from 1815, quoted in Lodge, 1901, p. 14, still refers to two laboratories under the Great Hall for chemical and galenical preparations.

was accompanied by a risk of fire and unpleasant smells. Consequently the decision to use the space instead for storage in 1822 must have been widely welcomed.

Maintaining the Society's reputation for the production and supply of quality drugs provided a further motivation for the developments. By 1822 the Society was facing increasing competition from other pharmaceutical firms known for selling reputable products. Although the Army decided to approach the Society regarding its drug supply, when it was considering the subject in 1808 it received tenders from Messrs Corbyn and Co., Messrs Bush and Howard, Messrs Kempson and Co., and Messrs Godfrey and Cooke, in addition to the Hall.[14] This was a sharp contrast to the situation a century earlier, when the Navy considered that the Society was the only suitable supplier of its drugs.

The appointment of William Thomas Brande[15] as Superintending Chemical Operator in 1812 with a remit to inspect the Society's chemical department was a further factor in the developments that took place in the 1810s and 1820s. It is possible that his appointment arose from the Society's future plans to expand its laboratories. The installation of the new steam apparatus in 1814 was the first project that he was involved in. Brande also made significant contributions to the Society as an institution. He encouraged the installation of coal gas apparatus for lighting the Hall and trade premises in 1816.[16] However, as Morris Berman has highlighted, Brande soon decided that he favoured oil gas and in 1819 the

[14] Fifth Report of the Commissioners of Military Enquiry (Army Medical Department), 1808 (6), VI, appendices nos. 63-5, pp. 233-8.

[15] See chapter four. For biographical references see Appendix A.

[16] A. Tulley, "The Chemical Studies of William Thomas Brande", MSc Thesis, London University, 1971, p. 157.

system at the Hall was replaced to reflect this.[17] Both the coal gas and oil gas systems were featured in the *Quarterly Journal of Science* and are examples of how Brande used the journal, which he edited, to showcase technical advances at the Society.[18] The new lighting was an impressive introduction to the Society for those visiting the Hall and when Burroughs Wellcome and Co. opened its new head office in 1883 the use of electric light had similar purposes.[19]

It is surely no coincidence that the period of greatest development to the laboratories took place in the decade following Brande's appointment, partly as a result of his encouragement and expertise. The appointment itself brought a further incentive for developing the laboratories, as a well-known chemist would have wanted to be associated with an impressive laboratory. In the early nineteenth century a number of new laboratories were set up in London, notably at scientific institutions, a status to which the Society aspired. Laboratory construction at the Royal, London and Surrey Institutions was driven by educational, intellectual and social concerns, led by men of landowning and aristocratic (Royal) and mercantile and manufacturing (London and Surrey) interests, and with functions for teaching and research.[20] It is unclear whether the Society was responding to

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[17] M. Berman, *Social Change and Scientific Organisation: The Royal Institution, 1799-1844* (London, 1978), p. 148.

[18] W.T. Brande, "Some Account of Mr Samuel Clegg's Improvements on the Apparatus Employed in Gas Illumination", *QJS*, **1** (1816), pp. 278-83; Anon., "Description of Taylor and Martineau's Patent Apparatus for the Production of Gas and Oil", *QJS*, **8** (1819), pp. 120-4.

[19] Robert Rhodes James, *Henry Wellcome* (London, 1994), pp. 108-9.

[20] J.N. Hays, "Science in the City: the London Institution, 1819-1840", *BJHS,* **7** (1974), pp. 146-62; Berman; Donovan Chilton and Noel G. Coley, "The laboratories of the Royal Institution in the nineteenth century", *Ambix,* **27** (1980), pp. 173-203; Frederick Kurzer, "A History of the Surrey Institution", *Annals of Science,* **57** (2000), pp. 109-41; Frederick Kurzer, "Chemistry and Chemists at the London Institution", *Annals of Science,* **58** (2001), pp. 163-201.

external developments in 1822, but possessing an up to date laboratory was considered characteristic of a scientific institution at this time.

The Layout of the New Laboratories

In 1822 the Society of Apothecaries paid £1,500 to purchase the lease of William Garnsey's Iron Foundry, which backed onto its property in Playhouse Yard, and rented the site to the soon to merge stock companies for the new laboratories.[21] In the eighteenth century, the foundry had been typical of the type of light industry surrounding the Hall. However, during the nineteenth century manufacturing in the area decreased, with the major industrial activity being the printing works of *The Times*, located to the south of Glasshouse Yard.[22]

The total capital invested by the United Stock in the developments was over £14,500, emphasising the commitment being made to the future of the pharmaceutical trade at Apothecaries' Hall.[23] The foundry was converted into what was called "the Great Laboratory",[24] an impressive structure measuring thirty by fifty feet and thirty feet high. All operations requiring intense heat were performed there, so it was the location for the open fires and furnaces, along with the high-pressure steam boiler.[25] The Great Laboratory

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[21] CM 26 July 1822; MS 8265, Property Papers and Deeds. The rent was to repay the Society for its expenditure, but the United Stock paid off the full amount in 1848 after which it had possession of the site's freehold.

[22] *The site of the office of the Times,* privately printed, 1956, copy consulted at AHA; Michael Ball and David Sunderland, *An Economic History of London, 1800-1914* (London, 2001), pp. 80-1.

[23] T/2, Laboratory Stock Audit Book.

[24] It is also called the "Chemical Laboratory", as in the 1823 booklet, but to avoid confusion with the other chemical laboratories I shall refer to it as the "Great Laboratory".

[25] Unless otherwise cited all descriptions of the post-1822 Hall laboratories come from the 1823 Booklet. Samuel Gray, *The Operative Chemist, being a practical display of the Arts and Manufacture which depend*

contained furnaces for manufacturing specific chemicals such as calomel and for providing different intensities of heat, with all flues running into a main shaft standing 100 feet high from its foundations. Its layout continued the tradition of the furnace's centrality to the chemical laboratory,[26] something that had applied to the Society's first laboratory under the Great Hall.[27] The construction of the Great Laboratory meant that the previous split between galenical and chemical departments no longer existed, and this would soon be followed by the end of the post of galenical operator.

The Great Laboratory was a considerable size compared to laboratories at other pharmaceutical establishments and none could match the range and number of furnaces. For example, at Allen and Hanburys 2 and 3 Plough Court served as a factory, warehouse, shop and living quarters[28] until the expansions of 1851, and when Thomas Morson moved to Southampton Row in 1826, the laboratory only occupied 300 square feet at the rear of the shop.[29]

However, the Great Laboratory was only one part of the Hall's manufacturing premises.[30] In 1822 capital was invested in both new and existing facilities. This included

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upon chemical principles (London, 1828), pp. 75-8, gives a slightly different layout, but it is unclear whether this was the result of further alterations occurring between 1823 and 1828.

[26] Usage of the term laboratory in the late sixteenth and early seventeenth centuries always referred to a space containing a furnace (Shapin, 1988, p. 377).

[27] Gunther, vol. 1, p. 47; Sketches of Hall Laboratory Apparatus, c. 18th Century.

[28] Stander, pp. 82-3.

[29] A.F.P. Morson, *Operative Chymist,* Clio Medica no. 45 (Amsterdam, 1997), p. 44.

[30] A tendency to focus on the Great Laboratory has resulted in the Hall's manufacturing capacity being overlooked. For example, Tweedale, 1990, states that the business at Plough Court "probably compared favourably with the Apothecaries' Hall in size, and, like its competitor, it was not a large scale operation" (p. 55). However, he cites only the dimensions of the Great Laboratory (p. 52).

improvements to the mill house, steam engine, high-pressure boiler and warehouses, in addition to a new shop, steam boiler and apparatus.[31] The Society was justifiably proud of the alterations. One of its members pressed for the inclusion of an article on the development in the *Quarterly Journal of Science*.[32] Meanwhile the Society also published a booklet entitled "The Origin, Progress and Present State of the Various Establishments for Conducting Chemical Processes and other Medicinal Preparations at Apothecaries Hall",[33] which used the new developments to promote the Society's activities in both pharmacy and chemistry.

It seems likely that Brande contributed to the design of the new premises and the second part of the booklet contains his description of the laboratories and associated facilities. Brande's positions as Professor of Chemistry at the Royal Institution and Fellow of the Royal Society are proudly listed and the booklet is one of the best examples of his name being used to promote the Hall trade. It seems likely that Brande's authorship led to a wider readership than the booklet would otherwise have had. As well as the account being reprinted in the *Quarterly Journal of Science*, much of its content appeared in Samuel Gray's *The Operative Chemist*.[34]

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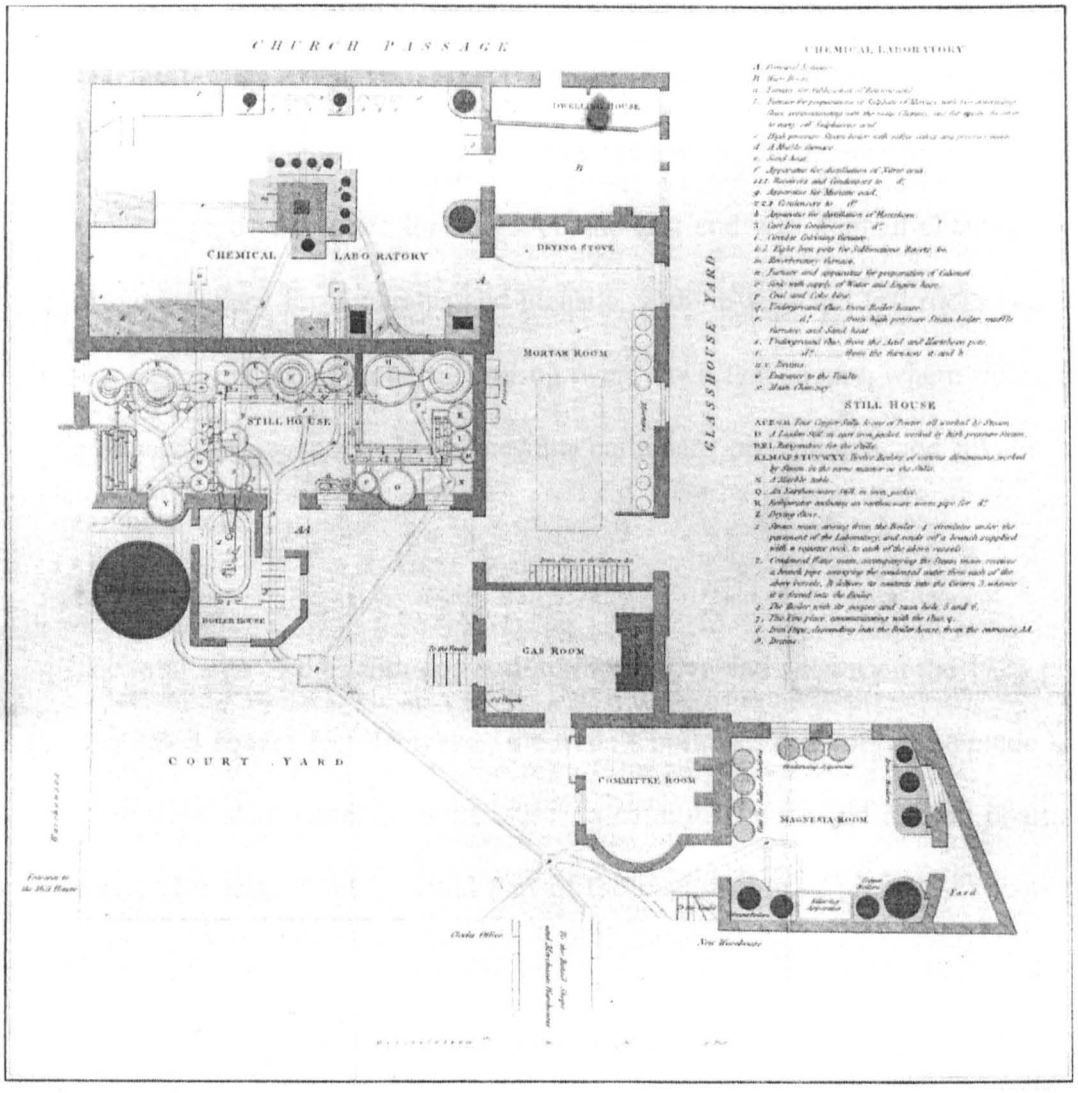
[31] T/2, Laboratory Stock Audit Book.

[32] Letters to the editor, *QJS*, **15** and **16** (1823), section entitled "to our readers and correspondents", unpaginated.

[33] 1823 Booklet.

[34] Anon., "A short account of the origin, progress and present state of the various establishments for conducting chemical processes and other medicinal preparations at Apothecaries Hall", *QJS*, **16** (1824), pp. 193-202; Gray, 1828, pp. 75-8.

Plan of Hall laboratories from booklet published by the Society in 1823 entitled "The Origin, Progress and Present State of the Various Establishments for Conducting Chemical Processes and other Medicinal Preparations at Apothecaries Hall".



The test room was located on the first floor off the gallery over the mortar room.

The booklet provides a clear description of the manufacturing premises at the Hall following the improvements of 1822. In addition to the Great Laboratory, there was a still house, measuring fifty by twenty feet. In this building, evaporations and distillations of spirits, ether and water were performed by steam, with extracts and plasters also prepared. The still house contained seven stills, the largest of which could hold five hundred gallons, indicating the bulk quantities required by the trade's customers. There were also twelve evaporating pans, condensers and a drying stove. The mortar room, measuring forty by twenty-two feet, contained mortars and presses for all manual pharmaceutical operations and a large drying stove for drugs. At the east end was a small chemical warehouse and above a gallery for apparatus and utensils, with an adjacent test room (see below). There was also a magnesia room, measuring twenty-two feet square, where saline solutions were produced and evaporated, magnesium carbonate precipitated and alkalis saturated with carbonic acid.

The total area of the laboratories described above and shown on the 1823 plan (see p. 72) was 3,864 square feet. However, the trade's premises did not only include laboratories, as there were also numerous warehouses, a counting house and a retail pharmacy. The mill house also formed an essential part of the manufacturing premises. It contained an eight horse-power steam engine, which powered machinery for grinding, sifting, triturating and pounding drugs. The fact that the Society ground its own drugs was an important indicator of their quality, as it was frequently alleged that when pharmaceutical firms sent drugs to grinders extraneous matter would be added to increase the bulk lost during the process.[35]

[35] For example barley meal was often added to jalap, whilst ginger was adulterated with capsicums, sawdust, satin-wood and flour. 44th, 45th and 46th Reports from the Select Committee on Poor Law Amendment Act (Medical Enquiry), 1837-8 (518), XVIII part 3, evidence of Róbert Dundas Thomson, p. 87.

Although the majority of laboratory space at the Hall was used for manufacturing, a room was set aside for drug testing and experimental purposes. The 1823 booklet describes the test room as a "small laboratory fitted up with the requisite apparatus for minute and delicate investigations in which chemical tests and other investigations requiring particular attention and cleanliness are prepared".[36] The test room was an important part of maintaining the Society's reputation as a quality supplier, as it demonstrated to customers the care taken in producing the drugs sold. It was used for quality control, as the 1823 booklet refers to the testing of drug samples by "experiment".[37] When the inspection sub-committee decided which drugs to purchase, it would sometimes ask the Hall chemists to perform chemical tests to determine their quality. However, no records remain about what this included or how often it happened. It appears that the members of the sub-committee generally relied on their own experience of the typical appearance, smell and taste of drugs to decide on the sample's quality. This was normal practice at the time, as the Royal College of Physicians and the Society of Apothecaries used sensory methods to assess drug standards when inspecting apothecary shops.[38]

Brande's description of the laboratories emphasises how impressive manufacturing facilities existed at the Hall. Although the booklet aimed to promote the Hall pharmaceutical trade, the description of the developments was unbiased. For example, Bell and Redwood included the description in their *Progress of Pharmacy,* whilst Anthony

[36] 1823 Booklet, p. 16.

[37] 1823 Booklet, p. 11.

[38] Anon., "An Exposition of the almost total Uselessness of the Examinations of Apothecary Shops by the Censors of the Royal College of Physicians and the Wardens of the Company of Apothecaries", *The Lancet,* 31 January 1829, pp. 554-6. When criticising the shop visitations, the author highlights how the imperfect vision, taste and sense of smell of the elderly Wardens were particular impediments to assessing drug quality. See also Ernst W. Stieb, with the collaboration of Glenn Sonnedecker, *Drug Adulteration: Detection and Control in Nineteenth-Century Britain* (Madison, 1966), pp. 31-4.

Todd Thomson featured plans of the steam laboratory in his *London Dispensatory.*[39] When the Censors of the Royal College of Physicians first visited the new laboratories in 1823, they stated how "everything in this establishment, as on former occasions, was found in the highest perfection and the most complete order".[40]

One verdict on the new laboratories was not as favourable. Samuel Frederick Gray (1780-1836) criticised various aspects of the Hall laboratories in *The Operative Chemist* of 1828. Gray was an author of chemical textbooks and supplements to the *Pharmacopoeia*, as well as a lecturer on materia medica, botany and pharmaceutical chemistry, who termed himself a "practical chemist".[41] He regarded the Hall's calcining furnace for magnesia as just a large stove hole, which could only be used in the evening because it filled the laboratory with smoke, whilst he also commented that the facilities in the test room were minimal.[42] Gray concluded that "the plan and description of these laboratories are sufficient to shew that they are by no means so well constructed as might be expected".[43] However Gray was not an impartial observer. His book was devoted to "the general practice of chemical arts and manufacture" and was aimed to be a guide for the "practical chemist".[44] Its purpose was to assist the small-scale manufacturer, who as an "operative chemist" was seeking to differentiate himself from the apothecary as a practitioner of chemistry.[45] In this context it

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[39] Bell and Redwood, pp. 81-4; A.T. Thomson, *The London Dispensatory* (London, 1815), plates six and seven.

[40] RCP Visitations MS 2180, 9 June 1823.

[41] Gray, 1828, frontispiece. DNB. His son John Edward became an important zoologist.

[42] Gray, 1828, pp. 76-7.

[43] Gray, 1828, p. 78.

[44] Gray, 1828, preface.

[45] Gerrylynn K. Roberts, "The Establishment of the Royal College of Chemistry: An Investigation of the Social Context of Early Victorian Chemistry", *Historical Studies in the Physical Sciences,* 7 (1976), pp. 437-85.

is unsurprising that Gray was dismissive of a grand institution such as the Society and had little regard for some of its costly new developments, complaining that the steam apparatus was "a mere show".[46] This was a contrast to the Censors of the Royal College of Physicians who were impressed by large laboratories with a wide range of apparatus.

Drug Manufacturing at Apothecaries' Hall

The chemical procedures occurring in the Society's laboratories highlight key characteristics of the Hall trade. By comparing certain examples of drug preparation at the Hall with those from the *Pharmacopoeia* or followed by other pharmaceutical firms, it is apparent that obtaining a high-quality product and facilitating large-scale production were crucial considerations when undertaking drug manufacture at the Hall. Whilst ensuring the supply of quality drugs remained central to the Hall's trading activities, the way in which this was achieved changed during the United Stock.

Although the majority of manufacturing processes followed at the Hall concurred with those in the *Pharmacopoeia*,[47] the Society felt able to deviate from its methods if necessary. This was partly because the College's pharmaceutical authority had been weakened by criticisms that many of the processes in its *1809 Pharmacopoeia* were impractical and failed to take account of advances in chemistry.[48] Furthermore, with such a

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[46] Gray, 1828, p. 78.

[47] In 1820 seven drugs were noted as being prepared by different processes from those in the *Pharmacopoeia.* RCP Visitations, 20 May 1820; Letter from W.T. Brande to the Royal College of Physicians, 21 December 1820, E/7 Loose Papers Box 3 (hereafter cited as Brande Pharmacopoeia Letter, 1820).

[48] Richard Phillips, a pharmacist and chemist with a shop in Poultry (*DNB*; *Quarterly Journal of the Chemical Society*, 5 (1853), pp. 155-8) voiced many of the complaints. He went on to publish an experimental edition of the *Pharmacopoeia,* which highlighted how Hall drugs differed from those obtained from the official instructions. Richard Phillips, *An Experimental Edition of the last Pharmacopoeia Londinensis with remarks on Dr Powell's Translation and Annotations* (London, 1811). A letter from C.L.

notable chemist as Brande, who was amongst the critics of the *1809 Pharmacopoeia*,[49] supervising the laboratories, the Society possessed a figure of authority who was able to provide up to date methods that suited to its requirements.[50]

In 1822 the production of drugs in bulk quantities was essential for the Hall trade. This was illustrated by the process followed for manufacturing calomel, a purgative and one of the most frequently used medicines in the formulary.

> Fifty pounds of mercury are boiled with 70 lbs of sulphuric acid to dryness in a cast iron vessel, forming 62 lbs of a white sulphate, which is triturated with 40½ lbs of mercury until the globules disappear. 34 lbs of common salt are added. The mixture is sublimed in earthen vessels, producing 95 to 100 lbs of calomel. It is washed in large quantities of distilled water, having been ground to a fine and unpalatable powder.[51]

In contrast, the *Pharmacopoeia's* method was less suited to large-scale manufacture and took longer, whilst the levigation described in it was conducted by hand when machinery was used at the Hall.[52] These were important considerations as the Hall's customers often required large quantities at short notice. For example, the East India Company purchased

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Cadet to P.J. Pelletier, 9 May 1817, reprinted in Leslie Matthews, "Pharmacy and Medicine in Nineteenth-Century England", *Pharmaceutical Journal*, **209** (1972), pp. 595-6, notes that the Hall "was run by competent men like Brande and Phillips" but I have found no other reference to Phillips' employment.

[49] Brande assisted Phillips with experiments for his experimental edition (Phillips, 1811, p. 67, p. 81).

[50] When the College Censors visited in 1820, they noted that if Brande thought a deviation was desirable, this had to be agreed by the managing committee prior to adoption. RCP Visitations, MS 2179, 20 May 1820.

[51] This method is taken from the following descriptions of the Hall's process: Brande Pharmacopoeia Letter, 1820; Samuel Gray, *The Elements of Pharmacy and the Chemical History of the Materia Medica* (London, 1823), p. 146; Pereira, 1839-40, vol. 1, p. 465.

[52] Pharmacopoeia, 1815, pp. 144-5. Levigation is the process by which a solid is reduced to a fine powder by the addition of water, agitation and subsequent drying.

over 3,000 lbs of calomel in 1827-8.[53] Unfortunately production methods for a comparable period do not exist for the firm that became Allen and Hanburys. In 1795 William Allen's preparation of calomel used corrosive sublimate (mercuric chloride) and quicksilver (mercury), as specified in the *Pharmacopoeia*, took nine days, and produced just over sixty-five pounds,[54] illustrating how the firm catered for a smaller market than the Hall. The Hall's preparation of calomel became a standard through its inclusion in Brande's *Manual of Chemistry* in 1819,[55] again demonstrating how good laboratory practice reflected favourably on the Society.

Guaranteeing the quality of the final product also resulted in the Hall deviating from the pharmacopoeial standard. In certain cases Brande believed that the College's methods led to contamination. For example, he advocated that benzoic acid should be prepared by sublimation, not precipitation, to avoid contaminating the benzoate of lime. For zinc oxide, decomposing pure zinc sulphate by ammonia was preferable to burning elemental zinc in a crucible.[56] However, in other cases the *Pharmacopoeia's* instructions were followed, if the Society believed this would produce the best product. For example, when manufacturing tincture of opium at the Hall, the opium was reduced to a powder[57] and macerated for fourteen days, as specified in the *Pharmacopoeia*. This time-consuming method was in contrast to that used by William Allen, which only lasted half a day.[58]

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[53] India Orders, 1827-8, MS 8261 (hereafter cited as India Orders).

[54] William Allen and Samuel Mildred, Laboratory Calculation Book, 1795-8, IRA 1997.072, Royal Pharmaceutical Society of Great Britain (hereafter cited as Allen Laboratory Book).

[55] W.T. Brande, *Manual of Chemistry* (London, 1819), p. 297.

[56] Brande Pharmacopoeia Letter, 1820; Pharmacopoeia, 1815, p. 54.

[57] E/7 Loose Papers, Box 4, Correspondence between the Society and Army Medical Board regarding possible Army contract, 1819-1821, letter 20 November 1819 (hereafter cited as Army Letter, 1819).

[58] Allen Laboratory Book.

Although chemical procedure at the Hall was dictated by the quality and quantity of drugs required, the Society did not manufacture all of the drugs that it sold. For example, magnesium sulphate, the purgative commonly known as Epsom salts, was bought in from wholesale manufacturers. However, it contained too many impurities to be used medicinally, so purification by means of solution, filtration and recrystalization was performed in the Hall laboratories.[59] The Society also found it preferable financially and practically to purchase tartaric, citric and sulphuric acid in bulk from chemical manufacturers.[60] However, both nitric and muriatic acid, bought in by many pharmaceutical firms, were produced at the Hall.[61] When giving evidence to the Select Committee on Medical Education in 1834, Henry Field, treasurer of the United Stock, admitted that some articles sold by the Hall were from wholesale druggists, but when asked which were prepared in the laboratory he replied "it is almost impossible to state, there are so many; almost all galenical or compound medicines, syrups, pills and a great many chemicals".[62]

An Absence of Further Development to the Hall Laboratories

Immediately after the developments of 1822, new products were manufactured in the Hall laboratories with the same enthusiasm that new plant and apparatus had been incorporated.

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[59] E/7 Loose Papers, Box 3, Correspondence between the Treasury and Brande, 27 December 1813, and Report of Counsel, 1814, regarding an appeal to exempt the Society from paying duty on Epsom salts, when it only purified them for re-sale.

[60] Report of the Select Committee on Medical Education, 1834 (602) XIII, Society of Apothecaries, part III, (hereafter cited as SCME III) pp. 63-5.

[61] Field's evidence (SCME III, p. 63) is contradicted by John Nussey (SCME III, p. 75). However, as Nussey admits that he is unfamiliar with the details of the Hall laboratory and Field is supported by other sources (1823 Booklet and Army Letter, 1819), Field is taken to be accurate. For biographies see Appendix B.

[62] SCME III, p. 65.

The Hall trade responded to the recent developments in the isolation of alkaloids.[63] For example, in 1824 Brande reported that the sample of quinine used in his research came from the Hall where "considerable quantities of the sulphate have already been prepared for medicinal use".[64] In 1825 the Chemical Committee of the Society of Arts commented that, "at the Apothecaries Hall the extraction of morphia from opium forms part of the regular business".[65] However, this enthusiasm for manufacturing new additions to the formulary did not last long. The manufacture of quinine at the Hall ceased when difficulties arose with the process. Consequently, the quinine sold by the Hall was brought from France, where it was supposedly superior and cheaper. In 1834 the Select Committee on Medical Education suggested that quinine was the type of drug that the Society should manufacture itself, as it was liable to adulteration. In response Henry Field stated "our laboratory would not be equal to the manufacture of a drug of that kind",[66] apparently because of the expensive and specialist equipment required.

In 1834 the decision not to develop the Society's trade in this way, although short-sighted, appeared pragmatic. The Hall, as an established pharmaceutical firm, did not consider an expensive new venture worth the risk it entailed commercially. This was a sharp contrast to the attitude of the young pharmacist Thomas Morson. He was seeking to make his name in London's pharmaceutical trade and prepared quinine sulphate from 1821. A further explanation for the Society's failure to develop quinine manufacture has been recently provided by Anthony Morson. He suggests that Henry Hennell, chemical operator 1821-

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[63] M. Weatherall, *In Search of a Cure: A History of Pharmaceutical Discovery* (Oxford, 1990), p. 20.

[64] W.T. Brande, "Observations on the Ultimate Analysis of Certain Vegetable Salifiable Bases", *QJS*, **16** (1824), pp. 279-86, quote from p. 286.

[65] *Transactions of the Society of Arts*, **43** (1825-6), pp. 56-7; Anon., "The Winslow Opium", *Pharmaceutical Journal*, **160** (1948), p. 151.

[66] SCME III, pp. 64-5.

42, was out of touch with developments in the field,[67] echoing the questioning of Hennell's scientific skills raised in chapter four.

The decision not to manufacture quinine was characteristic of the Hall's policy regarding drug manufacture and laboratory development for the rest of the United Stock. Although in 1822 it appeared that business was set to grow, following the loss of the Navy monopoly in 1823 the United Stock was faced with a drop in profits. By 1830 the stock's financial difficulties[68] necessitated reductions in the trade's operating expenses. In this climate of financial restraint, it is understandable why the Society did not want to incur the added expense of new equipment and preferred to purchase drugs instead. Additionally, the GCM's reluctance to invest further in new manufacturing facilities reflected its lethargic nature and was typical of the reputed conservatism of British business.[69]

In 1868, when Alexander Young Stewart was appointed chemical operator, the passive policy not to improve the Hall laboratories had developed further. The Hall trade no longer manufactured many of the drugs that it sold and instead it purchased them from outside suppliers.[70] It was effectively becoming a finisher and wholesaler of drugs, especially those required in bulk. The drug manufacturing that occurred at the Hall was on a smaller scale, with tinctures, ointments, extracts, pills and liquids (in decreasing commonness)

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[67] Morson, 1997, pp. 77-8.

[68] See Appendix D, Graph A. The dividends paid to the proprietors reflect the United Stock's prosperity.

[69] D.S. Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Europe from 1750 to the Present* (Cambridge, 1969), p. 337.

[70] An absence of drug manufacturing at the Hall was suggested as early as 1829, when Dr Francis Ramadge (George Clark, *A History of the Royal College of Physicians of London,* vol. 2 (Oxford, 1966), p. 667 and p. 678) a disaffected Censor of the Royal College of Physicians and vocal critic of the Society, objected strongly "to the little appearances there were of many articles being prepared by the Company themselves" (*The Lancet,* 31 January 1829, pp. 554-6, quote from p. 555).

accounting for the majority of the preparations in the Laboratory Process Book, covering the years 1868 to 1872.[71] Although some chemicals such as magnesium carbonate and sodium and potassium bicarbonate were still produced at the Hall,[72] core items supplied to India, such as cod liver oil and medicinal grade magnesium sulphate were bought in. This was an expensive policy as the Hall trade often purchased drugs from wholesale druggists rather than direct from manufacturers.[73]

The development of the chemical industry[74] manufacturing bulk quantities of chemicals of consistent quality enabled the Hall to easily obtain raw materials such as liquid potassium carbonate and iodine.[75] Meanwhile, increased recourse to the skills of the chemist[76] meant that reputation was no longer the primary criterion for judging drug quality. Improvements in standards could be demonstrated due to advances in analytical techniques,[77] whilst there was a greater emphasis on the concept of purity as organic chemistry developed.[78] As will be discussed in chapter five, these developments had a major impact on the demand for

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[71] Laboratory Process Book, 1868-72, MS 8277 (hereafter cited as Process Book). This is the only volume regarding Hall laboratory procedure that survives.

[72] Process Book, examples from pp. 44-8.

[73] Select Committee to enquire into the Adulteration of Food, Drink and Drugs, 1856 (379) VIII, p. 307, evidence of J. Drew, wholesale druggist.

[74] L.F. Haber, *The Chemical Industry during the Nineteenth Century* (Oxford, 1958); Russell et al., pp. 38-43.

[75] Listed in Process Book as "sundries for laboratory", pp. 49-50.

[76] Russell et al.; R. Bud and G.K. Roberts, *Science versus Practice. Chemistry in Victorian Britain* (Manchester, 1984).

[77] Stieb, chapters eight to fifteen; R.C. Chirnside and J.H. Hamence, *'The Practising Chemists': A History of the Society for Analytical Chemistry, 1874-1974* (London, 1974), pp. 27-33, summarises the apparatus and methods available for public analysts to test standards in 1874; For a classic account see, Ference Szabadvary, *History of Analytical Chemistry* (London, 1966).

[78] Wilfred Farrar, "Melting Points as a criteria of purity", *Education in Chemistry,* 7 (1970), pp. 16-17; W.A. Campbell, "Some Early Chemical Analyses of Proprietary Medicines", *Isis,* 69 (1978), pp. 226-33.

Hall drugs. They also meant that the Society no longer had to manufacture everything itself to supply high-quality drugs. Instead it could turn to firms with expertise in supplying a certain product. For example, the purgative podophyllin, introduced into medical practice during the 1850s, was notoriously difficult to deal with, so the Hall purchased it from William Ransom and Son of Hitchin, a specialist in galenicals.[79]

The rise in drug purchases from other firms was demonstrated by the greater use of the Hall's test room and the increased responsibility of the chemical operator to monitor standards.[80] The chemical testing of purchased drugs increased under Robert Warington, chemical operator from 1842 to 1866, even though he felt that this was an additional safeguard, rather than the crucial determinant of drug quality. The Hall always purchased the best quality drugs and ground and prepared everything on its premises, so despite the widespread nature of the problem, Warington stated that, "the adulteration of drugs does not often come under my notice".[81] Warington's comment reflected the Society's non-participation in the discussions during the 1860s and early 1870s that led to legislation on drug adulteration. Given the Society's remit as a guarantor of drug quality, the absence of any subsequent initiative by the Society or its chemists is noteworthy. It indicates the increasing inward focus of manufacturing at the Hall as the trade experienced difficulties,

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[79] Day Books and Orders and Accounts, 1852-81, William Ransom and Son, list orders from various firms for drugs and the quantities in which they are required. I am grateful to Michael Ransom for allowing access to these archives. Kenneth Holland, "William Ransom and Son PLC", *Pharmaceutical Journal*, **239** (1987), pp. 578-9.

[80] Although the first ruling by the GCM that the chemical operator should test all purchased chemicals for purity only occurs in 1879, it seems unlikely that this was a new policy, rather that the existing one was re-iterated due to the trade's problems (Special GCM 1 May 1879).

[81] First Report from the Select Committee on the Adulteration of Food, Drink and Drugs, 1855 (432), VIII, p. 49.

whilst the apparent absence of any approach for the Society's expertise illustrates its increased marginalization in chemical and pharmaceutical matters.

Although the range and quantity of drugs manufactured at the Hall was decreasing, the Hall did occasionally respond when new medicines were introduced into the formulary, if they were within the existing manufacturing capabilities of its laboratories. Chloral hydrate was first manufactured at the Hall in 1870, following its introduction into medical practice a year earlier.[82] Potassium iodide and bromide were also made with around 3,000 lbs and 400 lbs respectively produced in 1870.[83] However, the Society's competitors were manufacturing an even wider range of products. Firms such as Morsons, Howards and May and Baker produced bismuth salts, valerianic acid and iodine, whilst J.F. MacFarlan and Co. and T. and H. Smith in Edinburgh specialised in alkaloids and chloroform.[84]

Anthony Morson has emphasised how the 1840s were "a time of rapid change for the pharmacist, especially for those in manufacture and wholesaling".[85] This did not apply to the Hall trade. Whereas in the 1820s pharmaceutical manufacturing had a shop-based outlook, by the 1840s firms had developed to produce pharmaceutical chemicals on a larger scale. The Society went from being the leading pharmaceutical firm laboratory in London in 1822 to facing competition on numerous fronts. Taking Howards and Sons as an

[82] T.C. Butler, "The introduction of chloral hydrate into medical practice", *Bulletin of the History of Medicine,* **44** (1970), pp. 168-72.

[83] Process Book, KI, p. 214 and KBr, p. 227.

[84] Deric Bolton, "The Development of Alkaloid Manufacture in Edinburgh, 1832-1939", *Chemistry and Industry,* 4 September 1976, pp. 701-8; A.F.P. Morson, "Pharmacy in the 1840s: wholesale chemists and druggists", *Pharmaceutical Historian*, **21** no. 4, (1991), pp. 3-9.

[85] Morson, 1991, p. 3.

example, by the late 1830s, their turnover was beginning to match that at the Hall,[86] primarily due to the sales of quinine for which they were especially noted. Howards' Quinine and Tartaric Acid Works were described in *England's Workshops* in 1864,[87] which highlighted English manufacturing. Although the inclusion of the Society's laboratories in Gray's *Operative Chemist* seemed an appropriate example in 1828, by the 1860s they had been superseded.

At its works in Stratford, East London, Howards expanded its manufacturing facilities to produce drugs in bulk at competitive prices. In contrast, the Society was confined to the area surrounding the Hall, a built-up environment unsuited to large-scale chemical manufacture. There was little land available and it was too expensive for the Society to purchase or rent because of increased land values.[88] Additionally, as the Hall trade was carried on in the Society's name, it was tied to operating at Apothecaries' Hall. Blackfriars was increasingly becoming an unsuitable location for chemical manufacturing. Although the printing industry remained in the area, the chemical and allied industries' presence in the capital as a whole was decreasing.[89] The Hall's neighbourhood was changing dramatically. In the period 1859-71 a new Blackfriars Bridge and the Victoria Embankment were built, whilst some of the Society's land was subject to compulsory purchase for the London, Chatham and Dover Railway and Queen Victoria Street.[90]

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[86] In 1836 turnover was £36,558 and in 1837 £34,187 (A.W. Slater, "Howards, Chemical Manufacturers, 1797-1837, a study in business history", MSc Thesis, London University, 1955, pp. 320-1), compared to £38,014 and £37,676 at the Society.

[87] Gustave L.M. Strauss, Charles W. Quin, John C. Brough, Thomas Archer, William B. Tegetmeier, William J. Prowse, *England's Workshops* (London, 1864), pp. 142-9. With prestigious chemists amongst the authors, it is not surprising that the achievements of chemical firms such as Howards and Huskissons were lauded.

[88] Ball and Sunderland, p. 362.

[89] Ball and Sunderland, pp. 74-81.

[90] Underwood, pp. 59-60; Hunting, 1998, pp. 92-3.

Although the Society could not expand the area available for manufacturing, it also did little to improve plant and apparatus. After 1822-3 the only improvements to the Hall's manufacturing facilities were deepening the well to increase water supply for driving the steam engine and installing a beam engine to power the drug grinding mills.[91] This was very different from the numerous developments at the beginning of the century. The absence of change is shown in a description of the Society's premises in *Household Words* in 1856. This refers to calomel subliming, pestles pounding in mortars, mill stones grinding and "coppers all heated by steam full of costly juices from all corners of the world",[92] a picture that could have come from 1822. The description of the laboratory in a publication such as *Household Words* is noteworthy, as it indicates how outsiders viewed the trade. The article focussed on the Society's history, so any reader would have seen the trade as part of a historic livery company, rather than as a pharmaceutical firm.

That the Society did not develop its laboratories in the same way as commercial pharmaceutical firms may at first seem unusual due to its enthusiasm for chemistry and new technology in the 1810s and 1820s. However, this activity was partly encouraged by the initiative of talented chemists such as Brande and Hennell. There was a rationale behind the later reduction in drug manufacturing at the Hall. As a large-scale chemical industry developed it was logical for the Society to purchase drugs that it found difficult or expensive to manufacture itself, especially when expansion at the Hall was restricted. In addition to this lack of opportunity, there was also a lack of funds for development. The peculiar nature of the United Stock meant that there was little access to new capital, whilst

[91] Building Committee Minutes, MS 8232, vol. 2, 1837-46; GCM 4 December 1852, 3 December 1853.

[92] *Household Words*, 16 August 1856, pp. 108-15, quote from p. 114.

the value of shares was never increased to raise money for investment in the trade.[93] Even when the United Stock's fortunes recovered during the 1850s, the profits were not reinvested into the business and instead the proprietors benefited from high dividends. Meanwhile, in the absence of the enthusiasm of chemists such as Brande and Hennell, the lethargy and traditionalism of the GCM led to tried and tested methods being favoured over new processes. However, despite the limitations of its manufacturing processes, the Hall trade still sold high-quality drugs, something that was a major component of the Society's reputation.

The Laboratories and the Status of the Society of Apothecaries

From the very beginning of the Hall trade in 1672, the Society's reputation as a high-quality pharmaceutical firm had been rooted in its laboratory. When the United Stock was founded in 1822 not only did the Hall laboratories fulfil a practical function in relation to the Hall trade, they also had an important rhetorical function in promoting the Society's status. At this time the Hall laboratories were especially important because of changes in the Society's activities. Increased competition in the pharmaceutical marketplace made maintaining the Society's pharmaceutical authority a priority. Meanwhile, the Society's new responsibilities under the Apothecaries Act of 1815 opened up its activities to wider scrutiny.

As the Society now judged whether candidates were fit to practise medicine, it had to come across as a suitably intellectual and august institution. However, the stigma of trade still tainted the Society, with protests in *The Lancet* that medical practitioners were being examined by "a contemptible gang of retail druggists" and attacks on "the Old Hags of

[93] The value of shares only altered to reflect the profitability of the United Stock, the sale of property and additions from the accumulation fund. List of Capital, Dividends, Turnover (Trade), Expenses of United Stock, 1823-79, rear of Makins' notebook.

Rhubarb Hall".[94] Faced with such opposition it was especially important for the Society to establish its medical and pharmaceutical authority. However, the Society was not alone in experiencing attacks on its medical monopoly and privilege. *The Lancet's* editor, Thomas Wakley, detested the Royal College of Physicians and the Royal College of Surgeons even more than the Society, with these sentiments feeding into a wider movement attacking sinecures and monopolies around the time of 1832 Reform Act.[95] In such an atmosphere it was important for the Society to improve its public image and institutional authority, and the Hall laboratories added to the status that it aspired to.

A major component of the Society's reputation in the pharmaceutical trade and as a pharmaceutical authority came from outside organisations wanting to utilise its laboratories and its chemists' expertise. The Royal College of Physicians had instructed the Society's chemical and galenical operators to perform experiments on preparation methods prior to their inclusion in the *1809 Pharmacopoeia.*[96] The Society's co-operation and the importance of having "the use of their extensive laboratory" were acknowledged in the *Pharmacopoeia's* preface.[97] Although, as previously explained, there were extensive criticisms of the *1809 Pharmacopoeia,* it was important for the Society's pharmaceutical authority for it to be seen as a standard of reference. This was especially significant as, in addition to the increased competition facing its pharmaceutical trade, there was a

[94] *The Lancet,* 1 November 1828, pp. 148-9. See also 8 November 1828, pp. 178-81, 2 May 1829, pp. 146-9.

[95] Loudon, p. 185. For *The Lancet* see Jean Loudon and Irvine Loudon, "Medicine, Politics and the Medical Practitioner", in W.F. Bynum, Stephen Lock and Roy Porter (eds.), *Medical Journals and Medical Knowledge* (London, 1992), pp. 49-69. Michael Brock, *The Great Reform Act* (London, 1973).

[96] Royal College of Physicians, MS 2306-7, Minutes of Pharmacopoeia Revision Committee, 1806-9, 15 April, 21 October 1806 and 13 January 1807.

[97] Pharmacopoeia, 1815, p. v.

widespread perception that its members' dispensing role was being undermined by the chemist and druggist.[98]

The Society was also increasingly approached, mostly from its customers, to perform chemical analyses. In 1810 the Commissioners of Customs asked the Society to examine a sample of ginger that could have been contaminated with arsenic whilst on board an East India Company ship. Although the chemical operator detected no arsenic, on grounds of safety the Court of Assistants recommended that the entire consignment should be destroyed. Furthermore, the Court's communication indicated how the Society corporately, rather than the chemist, was the provider of the advice.[99] Although there were other sources of scientific expertise available, such as the Royal Institution,[100] in this case the established custom with the Hall and the fact that the colonial and commercial interests of the East India Company distanced its directors from the Royal Institution[101] favoured an approach to the Society. The appointment of William Brande encouraged more customers and government bodies to use the Society in this way, as discussed in chapter four, with the provision of expert advice an important boost to its reputation as a pharmaceutical firm.

Although the activities of the Hall chemists will be discussed in detail in chapter four, their achievements also had an influence on the Society as an institution. Taking research as an example, when Brande presented Hennell's work on the discovery of sulphovinic acid (ethyl sulphuric acid) before the Royal Society, Hennell's address was given as

[98] Loudon, pp. 133-8.

[99] CM 2 March 1810; SCA 29 March 1810. Small amounts of analytical work were probably performed for customers free of charge at this time, as this was considered part of the Society's high standard of service to its customers.

[100] For example Humphry Davy performed analyses for the Board of Agriculture (Berman, pp. 32-74).

[101] A group representing these interests eventually broke away from the Royal Institution to found the London Institution (Berman, p. 92).

Apothecaries' Hall. Consequently, the Society was shown as a location for chemical research and an employer of talented chemists. The favourable publicity generated by such research was probably a contributing factor to the Hall tolerating certain operators' non-trade related activities in its laboratories, as through this type of work the Society was seen as a promoter of chemistry.

The Hall laboratories took on further significance following the 1815 Apothecaries Act, as afterwards the Society's activities were subject to wider scrutiny. The laboratories were especially relevant to the Society's medical authority as the Act required candidates for the LSA to take classes in chemistry, and from 1835 in practical chemistry.[102] This reflected the Society's objective to make chemical training a criterion of the particular expertise of the apothecary and having state of the art laboratories supported the Society's educational objectives. Apprentices to members of the Society, who were now primarily students for the LSA, were able to use the laboratory to improve their chemical knowledge, often visiting after Brande's chemistry lectures (see below).[103] George Makins, who passed the LSA and later made his living as a chemist and metallurgist, recalled in his memoirs that having been bound as an apprentice at the Hall, he was taken on a tour of its laboratories by Henry Hennell, indicating how students were made aware of the facilities.[104]

The Society's educational responsibilities made it important for its activities to be seen to extend beyond the pharmaceutical trade and to benefit the medical students who came before it for examination. This was especially significant at the time of the Select

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[102] Bud and Roberts, p. 26.

[103] SCME III, p. 68. Field stated that apprentices to the Society had access to the laboratory whenever they chose to attend and that after Brande's lectures often fifteen or twenty went there.

[104] G.H. Makins' Autobiography, original in the possession of Helen Wickham, photocopy at AHA, p. 18. For biography of Makins see Appendix B.

Committee on Medical Education in 1834. This select committee was appointed to enquire into the state of the medical profession following complaints from medical practitioners. The Society came under specific criticism with respect to the system of apprenticeship contained in the Apothecaries Act, and its failure both to act against illegal practitioners and to recognise Scottish qualifications.[105] Additionally, it had to justify its use of the income obtained from licensing medical practitioners.[106]

One use of this income was the lectures given at the Hall by William Brande until 1851. However, these were not a direct consequence of the Act. Lectures on materia medica had started at the Hall at the beginning of the nineteenth century,[107] whilst Brande's appointment as Professor of Chemistry and Materia Medica also occurred before the Act was introduced. Brande formalised the content of the lectures and after 1815 they responded to the requirements of the Apothecaries Act, later forming the basis of Brande's *Manual of Pharmacy.*[108] Originally aimed at members of the Society and their apprentices, the lectures were later opened up to Licentiates of the Society and to senior medical students, with their content becoming more specialised.[109]

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[105] Loudon, pp. 176-88.

[106] SCME III, p. 70. In his evidence Field drew specific attention to how some of the income contributed to the cost of maintaining the Chelsea Physic Garden.

[107] Materia Medica Lectures began in 1803, a result of a bequest made by William Prowting in 1794, with Timothy Lane, Henry Field, Joseph Hurlock and Joseph Adams all delivering lectures on an ad hoc selection of subjects (CM 15 October 1794, 20 June 1803).

[108] Notes of Brande's lectures made by Charles Collambell in 1829-30 exist at AHA; W.T. Brande, *Manual of Pharmacy* (London, 1825).

[109] SCA 22 January 1840; Syllabus of Six Lectures on the Philosophy of Chemistry, 1851, attached to the draft re "A Return by the Master and Wardens of the Society of Apothecaries of the City of London in obedience to a Resolution of the House of Commons dated the 17th day of July 1856 [re Medical Museums, Libraries, Botanic Gardens etc]".

The objectives of boosting the Society's medical authority and extending its educational activities were behind other developments at the Hall during the United Stock, in which the trade played a part. The Society's library, which contained an impressive collection of medical and scientific books, was re-constituted in 1831 and to this the United Stock donated its own small library.[110] Possession of a library was common amongst learned institutions[111] and the Society undoubtedly thought that the further development of such a facility at the Hall would reflect favourably upon it. Similar considerations to raise the status of the Society as an institution were seen in its attempt to establish a museum of materia medica and chemical preparations in 1835, a project that was particularly suited to the Hall as there was a ready supply of specimens from the trade to call upon, in addition to the expertise of Brande and Hennell.[112]

The use of science to promote the Society's interests continued after Brande's death and when manufacturing activity in the Hall laboratories was declining. In 1867 the Court of Assistants highlighted "it is a peculiar province and duty of the Society of Apothecaries not only to appear but really to be cultivators and promoters of the sciences kindred to the Medical Profession".[113] This led to Henry Roscoe's series of lectures on spectrum analysis

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[110] Catalogue of the Library of the Society of Apothecaries, 1831; Library Committee Book, 1832-5.

[111] Examples are the Royal Colleges of Physicians in London and Edinburgh. See Clark, vol. 1, 1964, pp. 252, 337-8; Clark, vol. 2, 1966, pp. 528-30 and pp. 577-8; W.S. Craig, *History of the Royal College of Physicians of Edinburgh* (Oxford, 1976), pp. 117-33.

[112] CM 23 June 1835. No other reference is made to the museum until 1839 when Hennell drew the Court's attention to the necessity of further work on the collection. Consequently Hennell was directed to approach firms for samples of rare and fine drugs and the United Stock was asked to contribute three-fifths of the cost. However, no further references are found, possibly because Hennell was responsible for the project and he died three years later (CM 26 March, 1 December 1839).

[113] CM 30 October 1867.

at the Society, which were hailed as "a complete success" due not only to their content, but also because of the wide medical audience that was attracted.[114] Social microscopical conversaziones, organised by Nathaniel Bagshaw Ward, were also held at the Hall in the 1850s and early 1860s, attracting MPs and presidents of learned societies.[115] All of these events fitted into the culture of public science that was prevalent at the time.[116] Whilst these activities were primarily carried out under the auspices of the Society as a livery and licensing corporation, there was also the sentiment that any attempts to raise the Society's profile would have a reciprocal effect and boost the fortunes of the trade. Thus the Society's concerns for status and authority, whether pharmaceutical, medical or institutional, were frequently interlinked.

Conclusion

The construction of the Great Laboratory in 1822 was used both to expand manufacturing capacity and to raise the Society's scientific status. Combined with the earlier developments in the 1810s, it provided the Society with state of the art facilities for drug manufacturing that could be used to promote its functions as a licensing corporation and trading entity. Ensuring the manufacture of large quantities of high-quality drugs was a key motivation for the 1822 developments and this objective continued to guide manufacturing procedure at the Hall. However, during the fifty-eight years of the United Stock, pharmaceutical manufacturing developed more than in any previous period of the Hall laboratories' existence. In comparison, the laboratories themselves changed very little and new additions to the formulary were generally not manufactured. Increasingly many of the

[114] CM 18 December 1867, CM 26 June 1868.

[115] CM 22 December 1854, 29 June 1855, 27 March 1857, 26 March 1858 and 28 March 1864; Hunting, 1998, p. 211. For biography on Ward see Appendix B.

[116] Jan Golinski, *Science as Public Culture: Chemistry and Enlightenment in Britain* (Cambridge, 1992). For chemistry in the first part of the nineteenth century, see pp. 236-55.

drugs that the Society sold were purchased from its competitors. This was in sharp contrast to the developments in terms of product range, capacity and quality that were occurring in the pharmaceutical trade in Britain. Yet whilst activity in the laboratories had declined, the drugs sold by the Hall still maintained their reputation for quality. This was because the Society spared no expense when purchasing drugs on the open market, whilst it relied on traditional methods of manufacturing. Although this was less efficient and more costly for the Hall trade, it guaranteed the sale of quality products.

A significant aspect of this reputation for quality drugs came from the Hall laboratories, with their rhetorical function in boosting the Society's status an important motivation behind the 1822 developments. This was a demanding time for the Society as a result of its new responsibilities following the 1815 Apothecaries Act, the increasing competition faced by its pharmaceutical trade, and the criticisms about its drug trade detracting from its licensing role. The Society countered these attacks by increasing its range of chemical and pharmaceutical activities to encompass lectures, libraries and scientific conversaziones. The Great Laboratory took pride of place in the Society's achievements and indicates how a laboratory can generate authority within a wider institutional context. The Hall laboratories' profile was raised further by the activities of the chemists working there, something that boosted the Society's status as well. However, these activities also reflected the changing status of the chemical practitioner and the gradual development of a chemical profession.

CHAPTER FOUR

The Chemists of the United Stock, 1822-1880

The figure with the greatest influence over the pharmaceutical and chemical activities in the laboratories at Apothecaries' Hall during the lifetime of the United Stock was the chemical operator. The role dated from the foundation of the laboratories in 1672, when a chemical operator was appointed to manufacture chemical medicines, and ceased at the end of the United Stock in 1880. The responsibilities and activities of the chemical operator not only provide an insight into the workings of the Hall pharmaceutical trade, but in the nineteenth century they also vividly illustrate changes in chemical employment, as during this period a chemical profession was emerging in Great Britain. An exploration of the changing roles and activities of the chemists employed at Apothecaries' Hall, focussing on William Brande, superintending chemical operator from 1812 to 1866; Henry Hennell, chemical operator from 1821 to 1842; and Robert Warington, chemical operator from 1842 to 1866;[1] demonstrates how these chemists' practices reflected the developments in the profession of chemistry.

Chemical Employment at Apothecaries' Hall

During the eighteenth century, the responsibilities of the galenical and chemical operators remained virtually unchanged, with their work respectively centred on the different manufacturing requirements of the Navy and Laboratory Stocks. Although often little is known about the early operators, many can be identified as having been apprenticed as

[1] Biographical references for all post-1822 chemical operators are given in Appendix A. Whittet, 1977, contains biographies of all of the chemical operators.

apothecaries.[2] This applies to the two men who held the chemical and galenical posts in 1800, Francis Moore and Christopher Gregson.[3] For a number of the chemical operators, this type of training was especially relevant as they worked in the Hall laboratory prior to appointment, whilst being apprenticed to prominent members of the Laboratory Stock.[4] By the early nineteenth century there is evidence that the apprentice who was based in the Hall laboratory did not only gain practical experience in pharmaceutical manufacturing, but was also assisted in his wider chemical education. For example, Sylvanus Ronalds, apprenticed to Henry Field in 1808, was given money by the Laboratory Stock to purchase medical books and attend chemical lectures.[5] Ronalds was being trained to take on the post of chemical operator and although Francis Moore, the previous incumbent, ceased working in 1812, the post was only filled when Ronalds gained his freedom in 1816. Given the Laboratory Stock's investment in Ronalds, it is surprising that he only continued in the post until 1818.[6] However, Henry Hennell had worked in the laboratory since the

[2] For example Samuel Stringer, Francis Condy, Thomas Field, Stephen Griffin, John Friend and John Robson. A full list of the chemical and galenical operators identified is given in Appendix C.

[3] We know more about Gregson's life than any of the other eighteenth century operators, as he was a childhood friend of the engraver Thomas Bewick. Gregson was initially apprenticed to the Newcastle druggists John Doughty and Joshua Wiggins and in 1776 he was training as an apothecary in London. *Memoir of Thomas Bewick written by himself*, introduced by Thomas Bain (London, 1975), p. 41.

[4] For example, Stephen Griffin (chemical operator c.1781-c.1793) and Francis Moore were both apprenticed to Thomas Hall, the Laboratory Stock's Secretary.

[5] Petty Cash and Sundry Account Book, MS 8210, 1811-21 (contains miscellaneous expenses of the Laboratory Stock), entries 9 January 1813 and 3 February 1812. Ronalds was also paid during his apprenticeship for attending mercurial preparations in the laboratory.

[6] The reason for Ronalds' departure and disappearance from the list of Society members is unclear. It possibly suggests an early death, leaving the country or ceasing work as an apothecary.

beginning of his apprenticeship in 1814[7] and on gaining his freedom in 1821 he was appointed chemical operator.

As demonstrated in chapters two and three, the beginning of the nineteenth century was a period of development and reorganisation for the Hall trade. The motivations for these changes, which were aimed at improving the trade's operation and boosting the Society's reputation, also had an impact on the Hall's chemical employees. The proposed developments to the laboratories and the Society's desire to increase its scientific status led to the creation of a new position in the Hall laboratories when William Thomas Brande was appointed Superintending Chemical Operator and Professor of Chemistry and Materia Medica. There is a certain ambiguity over the actual date of Brande's appointment, as despite his obituary in the *Proceedings of the Royal Society* giving 4 November 1812,[8] it is not noted in the Society of Apothecaries' Court Minutes. Given the thoroughness of the Court Minutes at this time it seems strange that such an important appointment was not recorded. It appears that the initial arrangement with Brande in 1812 was in an advisory capacity to the trade, with his official appointment as professor occurring later and his lectures beginning in 1813.[9]

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[7] Hennell's presence in the laboratory is indicated by his signature as a witness on Laboratory Stock Bonds in 1814. Laboratory Stock Articles of Agreement, 1774-1822, MS 8216.

[8] *PRS*, **16** (1867-8), pp. ii-vi. It is also misleading that Brande was officially thanked by both the United Stock and the Court of Assistants in 1858 "for his many and valuable services to the Society during a period of forty years", when his involvement with the Society lasted longer than this (GCM 5 June, 4 December 1858; CM 30 July 1858).

[9] CM 25 June 1813. The first reference to Brande's appointment as professor comes when the lecture arrangements are discussed (CM 25 March 1813). Brande was not paid for his lectures until 1814, at the end of his first year as Professor (Warden's Cash Books, MS 8209, vol. 2, 1810-16).

Brande's role at the Society of Apothecaries was two-fold. His professorial appointment was aimed at developing the materia medica lectures that had started at the Hall in 1803 and which were intended to be of practical assistance to the Society's members, as well as to boost its scientific profile. The second aspect of Brande's role was his appointment as superintending chemical operator, which came with a remit to inspect the Society's chemical department.[10] Following the criticisms about the practicality of the methods contained in the *1809 Pharmacopoeia,* the Society especially wanted to be seen as incorporating current chemical practice into its manufacturing processes. Brande was an ideal choice for the new position as although he was only just beginning his career, he was already well known in London's scientific community. He had lectured on chemistry since 1808 and was elected a Fellow of the Royal Society in 1809 for his contributions to chemical medicine.

The creation of this new advisory and inspectorate position was not the only significant alteration to the existing chemical posts at Apothecaries' Hall at the beginning of the nineteenth century. When Christopher Gregson, the galenical operator died in 1815, he was succeeded by Richard Clarke.[11] Although the original division between the chemical and galenical operators corresponded to the different remits of the Laboratory and Navy Stocks, increasingly the production of medicines by a specific operator appeared arbitrary. Combined with the decreasing use of complex galenicals such as theriac or Philonium Londinense[12] the necessity of employing two operators was diminishing.

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[10] CM 25 March 1813.

[11] Information on Clarke is scarce. He did not train as an apothecary, but R. Clarke, chemist, is listed in PHIBB with the address Middlesex Place, Hackney Road, in 1803, although I have been unable to confirm whether he is the same man.

[12] These and similar substances were removed from the *Pharmacopoeia* in 1788 (Gilbert Watson, *Theriac and Mirthidatum: A Study in Therapeutics* (London, 1966), p. 143, p. 150). The decline in the use of these

When the Laboratory and Navy Stocks were dissolved in 1822, the main reason for employing separate laboratory personnel disappeared. As the warehouses, retail shops and laboratories all lost their distinct chemical or galenical nature in the reorganisations, it was not surprising that when a suitable opportunity arose the same occurred with the operators. In January 1826, Richard Clarke resigned as galenical operator and the two posts were combined as "due to the present united state of the chemical and galenical concerns of this Society it would not in future be requisite to employ two distinct operators".[13] Henry Hennell took over the combined practical role, with his new responsibilities requiring him to "take upon the management of all galenical processes and preparations" and "also to superintend the business of the drug mills",[14] which the galenical operator had previously performed. Thus two positions of chemical employment at Apothecaries' Hall remained: the chemical operator and the superintending chemical operator.

To fully understand the importance of the positions of superintending chemical operator and chemical operator, it is necessary to examine their respective contributions to the trade. The title superintending chemical operator was only ever given to William Brande, indicating the significance of his appointment to the Society. This post was primarily advisory, illustrated by Brande's contributions to the laboratory developments and the installation of coal gas and oil gas systems at the Hall, as discussed in chapter three. However, Brande was also appointed because of the prestige that he brought to the Society

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drugs has not been studied in detail, but reflects a move away from the tradition of heroic purges and bloodletting (John Harley Warner, "Therapeutic Explanation and the Edinburgh Blood-Letting Controversy", *Medical History,* **24** (1980), pp. 241-58) and the popularity of quack medicines which had fewer side-effects than many drugs prescribed by doctors at this time (Roy Porter, *Health for Sale: Quackery in England, 1660-1850* (Manchester, 1989), p. 143). For the implications of these trends on drug consumption see chapter five.

[13] GCM 4 March 1826.

[14] GCM 4 March 1826.

during a period when it was attempting to improve its public image and status. The 1823 booklet about the trade proudly states "the immediate business of the Chemical Laboratories, as relates to the Processes, Operations and Apparatus, are under the control of W.T Brande".[15] Even though it was the chemical operator who was involved with the trade on a daily basis, Brande's name was far more prestigious to cite than that of either Hennell or Clarke. Brande was also a source of chemical authority and expertise for the Society to quote, as he personally reported to the Royal College of Physicians about how drug manufacturing at the Hall differed from the *Pharmacopoeia.*[16] The importance of Brande's presence at the Hall is indicated by the fact that he was initially paid £200 per annum for his services, the same amount that he earned as Professor of Chemistry at the Royal Institution.[17]

As Brande's other chemical appointments increased (see p. 109) his services to the trade diminished, something that probably contributed to the drop in his salary to £100 per annum in 1831.[18] However, he was again active in the Society's affairs in the later years of his life. As his seniority in the Court of Assistants rose, culminating with his election as Master in 1851-2, his involvement with it and the GCM grew. Although the Royal Mint's ruling that its employees could not hold other paid positions led Brande to retire from the Royal Institution in 1852, his contribution to the Society and its trade continued until his

[15] 1823 Booklet, p. 11.

[16] Brande Pharmacopoeia Letter, 1820.

[17] GCM 6 March 1830; S. Forgan, "Faraday - From Servant to Savant: The Institutional Context", in David Gooding and Frank James (eds.), *Faraday Rediscovered: Essays on the Life and Work of Michael Faraday* (Basingstoke, 1985), pp. 51-67. Brande's salary at the Royal Institution was reduced to £150 per annum in 1825 (Forgan, p. 53).

[18] GCM 6 March 1830; USAB vols. 1 and 2.

death.[19] In 1852 he reported on the state of the laboratory steam engine in his capacity as superintending chemical operator, whilst in 1858 he was a member of the sub-committee appointed to investigate the prices and commercial affairs of the United Stock.[20] This latter position was a result of his supervisory post and his election to the GCM, of which he was a member from 1850 until his death in 1866. Brande was the only Hall chemist to become involved in the trade's management in this way, an involvement that stemmed from holding office in the Society and his social status relative to the other operators.

Although the actual title of superintending chemical operator was discontinued after Brande's death, James Lowe Wheeler, who had previously lectured on chemistry at the Surrey Institution,[21] was appointed in 1868 as "Inspector of the Laboratory, Machinery and Co, as performed by the late Mr Brande".[22] Wheeler's tenure was short as he died in 1870 and Edward Bradford's appointment as General Superintendent of the Entire Working Department in 1872 made him effectively Wheeler's successor. However, Bradford was not a chemist, but a distinguished Army medic and possessed few relevant qualifications for laboratory supervision at the Hall, except his unfailing support for the Society.[23]

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[19] Edward Ironmonger, "Further Thoughts on W.T. Brande", *Proceedings of the Royal Institution,* 44 (1970), pp. 262-73; Brande was paid £100 per annum by the United Stock until at least 1859. Unfortunately the relevant payment data for 1860-7 is missing from USAB vol. 4, so it is unknown whether he was paid until his death for his work as superintending chemical operator.

[20] GCM 4 December 1852; GCM 6 March 1858. Although the sub-committee was made up of GCM members, those chosen had very strong links to the trade and included the current and former treasurers.

[21] Kurzer, 2000; James Lowe Wheeler (1793-1870) was the Society's Botanical Demonstrator from 1821-34, Master in 1864-5, and the son of Thomas Wheeler, a former Botanical Demonstrator and apothecary to St Bartholomew's Hospital.

[22] GCM 3 June 1868.

[23] Following a career as an Army Surgeon, Edward Bradford (1802-88), was appointed Deputy Inspector General of Hospitals and later acted as surgeon to the Queen and the Royal Military College at Sandhurst. He

Unsurprisingly, his appointment was ineffective, as discussed in the context of the trade's difficulties in the 1870s in chapter six. Thus after Brande's successful tenure as superintending chemical operator, the appointment of an advisory chemist became more concerned with overseeing the trade's employees than with improving chemical practice or raising the status of the Society.

Whilst the superintending chemical operator had primarily advisory responsibilities, the chemical operator's role was practical. After the amalgamation of the galenical and chemical posts, the chemical operator supervised all manufacturing occurring at the Hall, ranging from the grinding of drugs to distillation in the still house. He was responsible for the quality of drugs produced at the Hall and the testing of any purchased drugs, with this role increasing as fewer drugs were manufactured in the Hall laboratories.

The second aspect of the chemical operator's post was administrative. He assisted the trade's operation by liasing with the various committees, clerks and customers on subjects that required chemical and pharmaceutical expertise. In the only job description for the position that exists, made when the galenical post was abolished in 1826, in addition to his manufacturing work Hennell had to:

> Attend meetings of the committees of buying, inspection and pricing, rendering them every information and assistance which they may require and to give such an explanation as may be required at any time to the clerks in the counting house of any obscurities which may occur in the titles of

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chaired the Court of Examiners, represented the Society on the General Medical Council and protested at the Society's loss of influence on the formation of the Conjoint Board in 1870 by publishing a pamphlet stating their case. Sir D'Arcy Power (rev.), *Plarr's Lives of the Fellows of the Royal College of Surgeons of England* vol. 1 (London, 1930), (hereafter cited as Plarr), p. 132; *Medical Directory*.

drugs or medicines contained in letters and orders received from merchants and others.[24]

In his capacity as chemical operator, Hennell also dealt directly with customers and suppliers to ensure that deliveries were made on time.[25]

The chemical operators were also involved in the developments of the Hall trade. For example, both Hennell and later Robert Warington gave instructions to the engineers regarding the trade's requirements for an increased water supply when the well was deepened.[26] The final role of the chemical operator was supervisory, as he was in charge of all of the employees working in the laboratory. He was assisted in this task by the foreman, who was a constant presence in the laboratories at the Hall, ensuring that manufacturing was carried out correctly. Manufacturing work was strenuous, with the workmen employed spending hours stirring vats, grinding large quantities of drugs or monitoring processes in the furnaces.[27] The laboratories were hot, smoky, dirty and dangerous places, so adequate supervision was important. Fire was a constant threat and many of the laboratory workmen formed part of the Society's fire brigade, which had its own uniform and drills.[28]

Whilst these four aspects covered the responsibilities of the Hall operators to the trade, their activities extended beyond their commitments to the United Stock. This was a

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[24] GCM 4 March 1826.

[25] Prior to preparing mercury fulminate in 1842, Hennell was in touch with the intended suppliers and the agent of the East India Company, the customer (E/7 Loose Papers, Box 6, Inquest on Mr Hennell, evidence from Frederick Leffler and Charles Rivers).

[26] Building Committee Minutes, MS 8232 vol. 2, 1837-46.

[27] Morson, 1991; Hanbury, 1951, provide a vivid picture of drug manufacturing during this period.

[28] Makins' Notebook, pp. 61-6, identifies the employees who received a small bonus for being a member of the fire brigade at the Hall. I am grateful to Dee Cook for the information taken from her display on the Hall Fire Brigade, AHA.

contrast from the eighteenth and early-nineteenth centuries, when the work of both operators centred on the trade at the Hall. Any extra tasks were undertaken as a result of direction from the senior members of the stock companies or the Court of Assistants, as is shown in the work for the *Pharmacopoeia Londinensis* and the Commissioners of Customs, discussed in chapter three. However, as the century progressed, increasingly the chemical operators had more independence and often their reputations surpassed that of the Society. This shift in the characteristics, status and activities of the operators was tied up with changes in the practice of chemistry and the general emergence of a professional career.

The Changing Identity of the Chemist

The emergence of a chemical profession during the nineteenth century resulted from the interaction of a number of factors. In Britain, as chemists sought to define their area of jurisdiction[29] the development of professional institutions was especially important.[30] The Hall chemists during the United Stock can be seen as transitional figures in terms of their education and status, with their practices reflecting the development of a profession of chemistry. The six "stages" of professionalization identified by J.B. Morrell: (an increase in the number of full-time paid positions; the establishment of specialist qualifications defining scientific competence; the development of training procedures; the rapid growth of specialisation; increased group solidarity and self-consciousness; and the development

[29] Andrew Abbott, *The system of professions: an essay on the division of expert labor* (Chicago, 1988).

[30] Russell et al.; I am grateful to Robin Mackie and Gerrylynn Roberts for letting me read the English version of their article "Chemical Institutions: the professional chemist", which will appear in D.M. Knight (ed.), *Instituto della Enciclopedia Italiana fondata de Giovani Trecani, Storia Della Scienza, voll. vi-vii: 'La scienza dell '800 sez. E: Chemistry'* (forthcoming 2004).

of reward systems to recognise best practice)[31] provide a useful background when discussing the changing roles of the Hall chemists. Even though the concept of professionalization has its limitations, it is useful in this context, as chemistry in Britain fits the model better than many other scientific disciplines[32] or other countries.[33] As the chemical operators are examined in turn, paying specific attention to the education that they received, their status in London's chemical community, and the activities they pursued, the applicability of these "stages" will be considered.

Brande and Hennell: Training as an Apothecary, but Practice as a Chemist

Although Brande and Hennell had quite different responsibilities to the Hall trade (one advisory, the other practical) as they were both working during the same period, it is useful to discuss them together. Considering education and training, at first sight the routes of Brande and Hennell to their respective positions in the trade seemed similar to their predecessors, as both served an apprenticeship as an apothecary and were linked to the Hall prior to their official appointments. Brande was apprenticed to his brother Everard, a royal apothecary and member of the Society. Hennell was apprenticed to John Hunter, a

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[31] J.B. Morrell, "Professionalisation", in R.C. Olby, G.N. Cantor, J.R.R. Christie and M.J.S. Hodge (eds.), *Companion to the History of Modern Science* (London, 1990), pp. 980-9. It is also necessary to consider the Carr-Saunders/Wilson approach, which takes professionalization as "an aspect of occupational development and strategy" (Morrell, 1990, p. 981) driven by a desire for higher status and remuneration, in addition to control of one's working conditions. A.M. Carr-Saunders and P.A. Wilson, *The Professions* (London, 1964). See pp. 165-75 for chemists.

[32] Ruth Barton, "'Men of Science': Language, Identity and Professionalization in the mid-Victorian Scientific Community", *History of Science,* 41 (2003), pp. 73-119.

[33] In contrast to Britain, chemical institutions had little influence on the development of the chemical profession in France and Germany. Mackie and Roberts, "Chemical Institutions" (forthcoming 2004); Essays on the situation in different countries are found in David Knight and Helge Kragh (eds.), *The Making of the Chemist. The Social History of Chemistry in Europe, 1789-1914* (Cambridge, 1998).

prominent member of the Laboratory Stock, whilst he also worked in the Hall laboratory.[34] At this time the apothecary's apprenticeship had significant benefits for those wanting an education in practical chemistry, something that Colin Russell has highlighted in the case of Edward Frankland.[35] However, an apothecary's apprenticeship and the expertise of their master were not the only constituents of Brande and Hennell's chemical training, as the range of scientific lectures and societies[36] in London provided further opportunities to increase chemical understanding.

Following an education at Westminster, Brande attended chemical lectures by George Pearson[37] at St George's Hospital and was also as a pupil at the Anatomical and Medical School in Windmill Street, a much more formal education than the chemists who had previously worked at the Hall. Encouraged by the influence of Charles Hatchett, the chemist and mineralogist,[38] Brande's enthusiasm for chemistry grew and he was soon

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[34] Brande: PC 2 February 1802, 6 February 1810; Hennell: PC 5 April 1814, 1 May 1821.

[35] Colin A. Russell, *Lancastrian Chemist: The Early Years of Sir Edward Frankland* (Milton Keynes, 1986), p. 110.

[36] Iàn Inkster, "Science and Society in the Metropolis: A Preliminary Examination of the Social and Institutional Context of the Askesian Society of London, 1796-1807", *Annals of Science,* **34** (1977), pp. 1-32; J.N. Hays, "The London lecturing empire, 1800-50", in Ian Inkster and Jack Morrell (eds.), *Metropolis and Province: Science in British Culture, 1780-1850* (London, 1983), pp. 91-119; Gwen Averley, "The Social Chemists: English Chemical Societies in the eighteenth and early nineteenth centuries", *Ambix,* **33** (1986), pp. 99-128; Golinksi, pp. 236-55. For a discussion of the active role cities play in shaping scientific practice and knowledge see Sven Dierig, Jens Lachmund and J. Andrew Mendelsohn, "Science in the City", *Osiris,* **18** (2003).

[37] Noel. G. Coley, "George Pearson, FRS (1751-1828): 'The Greatest Chemist in England'?" *Notes and Records of the Royal Society of London,* **57** (2003), pp. 161-75.

[38] *DNB*; *DSB*. Brande married Hatchett's daughter, Anna Frederica in 1818.

participating in a range of scientific societies, including the Animal Chemistry Club[39] and the Royal Society, which enabled him to make acquaintances with chemists such as Humphry Davy and the surgeon Benjamin Brodie.

Meanwhile, Hennell was a member of the City Philosophical Society, along with Michael Faraday and Thomas Morson. This society was quite different from those Brande participated in, having been founded in 1808 with specific educational and self-improvement aims.[40] When the City Philosophical Society ended, Hennell was a member of a group that met in each other's homes to read scientific journals.[41] The increasing importance of scientific societies and lectures can also be seen in the education and activities of other Hall chemical employees in the early-nineteenth century. Ronalds' lecture attendance has already been noted, whilst societies with practical and educational objectives were of particular interest to Hall employees. For example Hennell, Richard Clarke and Gysbert Villette (the trade's chemical accountant) were all members of the Society of Arts in the 1820s,[42] whilst Clarke and later Robert Warington[43] were members

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[39] Noel G. Coley, "The Animal Chemistry Club: Assistant Society to the Royal Society", *Notes and Records of the Royal Society of London,* **22** (1967), pp. 173-85.

[40] Frank A.J.L. James, "Michael Faraday, the City Philosophical Society and the Society of Arts", *Royal Society of Arts Journal,* **140** (1992), pp. 192-9; Inkster, 1977.

[41] J.H. Gladstone, *Michael Faraday* (London, 1873), pp. 20-21.

[42] Lists of members are included in *Transactions of the Society of Arts.* Frank James has emphasised how many members of the Chemical Committee of the Society of Arts had been members of the City Philosophical Society, of which Hennell is an example (James, 1992) and it is possible that he encouraged Clarke and Villette to join.

[43] Larry Stewart and Paul Weindling, "Philosophical threads: natural philosophy and public experiment among the weavers of Spitalfields", *BJHS*, **28** (1995), pp. 37-62.Warington lectured to the Mathematical Society in 1839 and 1840 and some Spitalfields' members were amongst the founders of the Chemical Society. Robert Warington Senior Papers, Section G, Institute of Arable Crop Research (IACR), Rothamsted,

of the Spitalfields Mathematical Society. This overall pattern of lecture attendance and society membership indicates the different allegiances of men with scientific interests at this time, something that reflects David Miller's portrayal of the factions within the Royal Society before and during Humphry Davy's presidency.[44]

Despite the accessibility of other educational opportunities, the master-pupil relationship remained an important component of a chemist's training. Hennell's chemical skills were further encouraged by Brande in the Hall laboratory, and although the exact nature of this influence is unclear,[45] it seems similar to Brande's relationship with Michael Faraday at the Royal Institution. The men were close on personal and professional terms and Brande always gave due credit to the younger man's work.[46] The tradition of educating young chemists in the Hall laboratories continued as Frederick Penny, Professor of Chemistry at Anderson's University in Glasgow from 1839,[47] was Hennell's pupil in the Hall laboratory for five years from 1833. From research performed at the Hall and supervised by Hennell, Penny wrote a paper on equivalent weights,[48] which has since been described as a "tribute to his native talent and the excellence of his teachers".[49]

Harpenden (hereafter cited as Robert Warington Senior Papers, IACR). Folder 1, Mathematical and Chemical Society.

[44] David Miller, "Between Hostile Camps: Sir Humphry Davy's Presidency of the Royal Society of London, 1820-1827", *BJHS*, **16** (1983), pp. 1-47.

[45] Brande's obituary in *PRS*, **16** (1867-8), pp. ii-vi, describes Hennell as his pupil, although Hennell was not apprenticed to him.

[46] Geoffrey Cantor, *Michael Faraday: A Study of Science and Religion in the Nineteenth Century* (London, 1991), p. 138; Faraday's contribution is acknowledged by Brande in the preface to his *Manual of Chemistry* (Brande, 1819), whilst Brande reported Hennell's work on sulphovinic acid (see p. 111) to the Royal Society.

[47] For biographical references see Appendix A.

[48] F. Penny, "On the Application of the Conversion of Chlorates and Nitrates into Chlorides, and of Chlorides into Nitrates, to the Determination of several Equivalent Numbers", *Philosophical Transactions*, 1839, pp.

As illustrated by their respective educations and participation in various scientific societies, Brande and Hennell came from different social backgrounds.[50] This was reflected in their relative positions at the Hall, their activities as chemists and how they perceived themselves. Although not as well known today, Brande undoubtedly saw himself as one of most prominent chemists in London in the first half of the nineteenth century and he was publicly recognised as such. He held numerous appointments, succeeding Humphry Davy as Professor of Chemistry at the Royal Institution in 1813 and being employed by the Royal Mint from 1825. He also lectured extensively on chemistry and was employed as an expert witness, all of which indicated the increased number of paid roles for the chemist.

Whilst Brande is known for his commercial analysis work at the Royal Institution,[51] he also benefited from lucrative consultancy work performed in the Hall laboratories.[52] This was often initiated by the Hall's relationship with its customers. For example, Brande analysed impurities in all of the saltpetre (potassium nitrate) brought into the country by the East India Company, as well as that from certain merchants,[53] in addition to analysing

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13-33. Hennell read the paper to the Royal Society and it gave Apothecaries' Hall as Penny's address in January 1839.

[49] Harry Irving, "The Centenary of Penny's Process: A Landmark in the History of Analytical Chemistry", *Science Progress*, **39** (1951), pp. 63-6, quote from p. 64.

[50] Brande's father, Augustus Everard, was a member of the distinguished Brande family of apothecaries, who served the Hanoverian monarchs. Leslie Matthews, *Royal Apothecaries* (London, 1967), p. 152. Hennell's father, David, was a painter stainer from Islington.

[51] Berman, pp. 131-2; Forgan, pp. 56-7.

[52] Hennell apparently did not perform any consultancy work at the Hall, but it is probable that Brande would have had prior claim to any work arising.

[53] E/7 Loose Papers, Box 3, letters 5 October 1815, James Cobb to Master; 10 October 1815, Sotherton Backler to East India Company. The original agreement was made in 1813.

cream of tartar for the Privy Council Board of Trade.[54] The work for the East India Company brought Brande a significant income and was a contributing factor when his Hall salary was reduced.[55] Brande's consultancy work at the Hall generally involved testing substances chemically, rather than providing advice. Even though bodies such as the Navy had an ongoing association with the Hall through the purchase of drugs, when widespread investigations into scientific applications were required they approached organisations such as the Royal Society. Various scientific committees were set up there during Humphry Davy's presidency in response to government requests, with Brande sitting on a committee in 1823 to investigate copper sheathing on ships for the Admiralty.[56]

In contrast to Brande, whose appointment at the Hall was one of many that he held, Hennell's work as a chemist was very much defined by his position as chemical operator to the Society of Apothecaries. Hennell always placed the needs of the trade first. In 1842 the East India Company required the explosive mercury fulminate for use in the Afghan War. However when the usual suppliers were unable to provide it Hennell decided to prepare it himself, to ensure that delivery was made on time. This was despite its preparation being outside the pharmaceutical remit of the Hall laboratories, whilst Brande had warned about the dangers of the process. However, Hennell believed that he was taking sufficient precautions by working in the courtyard at the Hall. Tragically, he was incorrect and the explosion that occurred cost Hennell his life.[57] According to his wife, Hennell's actions were characteristic of his loyalty to the Hall trade as his "uncompromising desire for the

[54] E/7 Loose Papers, Box 3, letter from the Office of the Committee of the Council of Trade, 11 May 1813 and notes made by Brande on the analysis, 15 June 1813.

[55] GCM 6 March 1830; USAB vols. 1 and 2.

[56] Frank A.J.L. James, "Davy in the Dockyard: Humphry Davy, the Royal Society and the Electro-chemical Protection of the Copper Sheeting of His Majesty's Ships in the Mid 1820s", *Physis*, 29 (1992), pp. 205-25.

[57] E/7 Loose Papers, Box 6, Inquest on Mr Hennell, 1842.

furtherance of the United Stock rendered him at all times regardless of his own personal comfort and in this case his safety also".[58]

Although he was devoted to the trade at the Hall, Hennell was a well-known figure amongst chemists in London. This primarily came through his research work, the final area of his and Brande's chemical activity to be discussed. Whilst Brande published numerous papers, little of his work made any lasting influence on the field and his impact on nineteenth century chemistry came more through chemical education and the practical application of chemistry. His positions at the Royal Institution and the Mint gave him access to laboratories more suited to experimental work than those at the Hall and consequently it seems unlikely that he undertook much research there.

By comparison, Hennell was based solely at Apothecaries' Hall and most of his research was probably performed there, something that added to the Society's status. Although his publications were minimal, Hennell's reputation as a chemist came from his discovery of sulphovinic acid, a process that was noteworthy as it involved the synthesis of ethanol from inorganic starting materials, ethylene and sulphuric acid.[59] Although Hennell regarded his research as a simple preparation[60] and failed to understand its synthetic significance, his work was important as it utilised careful analytical procedures to

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[58] Special GCP 16 July 1842.

[59] H. Hennell, "On the mutual action of sulphuric acid and alcohol", *Philosophical Transactions*, 1826, pp. 240-9; H. Hennell, "On the mutual action of sulphuric acid and alcohol, and on the nature of the process by which ether is formed", *Philosophical Transactions*, 1828, pp. 365-71; B. Hernstein, "When and by whom was alcohol first prepared from ethylene?" *Chemistry and Industry*, 4 October 1935, **13**, pp. 881-4.

[60] Colin A. Russell, "The Changing Role of Synthesis in Organic Chemistry", *Ambix*, **34** (1987), pp. 169-80.

determine a mechanism of reaction.[61] The process was later significant in industry and was credited to the French organic chemist Pierre Berthelot.[62]

Some of Hennell's research was prompted by his work for the Hall trade. Whilst preparing tincture of elaterium, a powerful hydragogue and cathartic, Hennell observed crystallization taking place. He then produced the tincture on a smaller scale and obtained crystals of a bitter principle, elaterin ($C_{20}H_{28}O_5$) which he subjected to elemental analysis and passed to a friend for trials at St Bartholomew's Hospital.[63] Hennell also provided extensive assistance to Penny's research on equivalent weights. It is possible that this enquiry also originated in work for the Hall trade. Penny stated in his paper that his research originated from experiments undertaken to ascertain the quantity of potassium nitrate in crude saltpetre,[64] an investigation that would have been very relevant to Brande's analyses of saltpetre for the East India Company.

Following in the tradition of earlier chemical operators, Hennell also contributed to the compilation of the *Pharmacopoeia.* He worked with the physician William Babington on the 1824 edition, performing experiments in Babington's home[65] and provided information for Richard Phillips' official translation of the *1836 Pharmacopoeia*,[66] something that

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[61] Claus Priesner, "Formation of Ether: theories of etherification from Valerius Cordus to Alexander Williamson", *Ambix*, **33** (1986), pp. 129-152

[62] *DSB.* Initially Berthelot did not acknowledge Hennell's work on the subject, although he was forced to do so following an attack by R. Meldola. J.R. Partington, *A History of Chemistry,* vol. 4, (London, 1964), p. 468.

[63] H. Hennell, "On Elaterium and a new principle obtained from it by analysis", *Royal Institution Journal*, **1** (1831), pp. 532-4.

[64] Penny, p. 13.

[65] SCME III, p. 66. For biography on Babington see *DNB; DSB*; *PRS*, no. 14 (1832-3), pp. 227-8.

[66] Richard Phillips, *Translation of the Pharmacopoeia of the Royal College of Physicians of London, 1836,* fourth edition (London, 1841).

reflected favourably on both Hennell and the Society. Additionally Hennell performed experiments at the Hall on behalf of the Chemical Committee of the Society of Arts[67] of which he was chair from 1827. In 1825 he was asked to determine the quantity of morphine in English opium.[68] However, Thomas Morson later questioned the accuracy of Hennell's results,[69] another criticism of his chemical abilities. This is compounded by the circumstances surrounding his death and retrospectively doubt is cast on Hennell's chemical judgement. However, at the time, the event was described as "a lamentable accident which no intelligence could have foreseen".[70]

Robert Warington: "professional chemist"

Hennell's successor as chemical operator was Robert Warington, son of a victualler of ships, who was educated at Merchant Taylors' School. Like Brande and Hennell, Warington acquired his chemical training through apprenticeship, although not to a member of the Society of Apothecaries. Warington was apprenticed to John Thomas Cooper, who had trained in medicine, then become a manufacturer of rare metals and later a lecturer and a chemical consultant.[71] Warington also gained greater experience as a chemist prior to his appointment. He became an assistant to Edward Turner, Professor of Chemistry at University College, London, in 1828 and was the first chemist employed by the brewers Messrs Truman, Hanbury and Buxton in 1831. However, in 1842 Frederick

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[67] These were to test entries for the prizes that the Society of Arts awarded, for example testing new uses for sugar waste (7 February 1839). Minutes of the Chemical Committee, Society of Arts, PR/GE/112/12/62-84, covering 1820-1 to 1842-3.

[68] *Transactions of the Society of Arts*, **43** (1825-6), pp. 56-7; Anon., "The Winslow Opium", *Pharmaceutical Journal*, **160** (1948), p. 151.

[69] 27 November 1832, Minutes of the Chemical Committee, PR/GE/112/12/74; Morson, 1997, p. 99.

[70] *Memoirs of the Chemical Society*, **1** (1841-3), p. 52.

[71] *Gentleman's Magazine*, November 1854, p. 521; *Quarterly Journal of the Chemical Society*, **8** (1856), pp. 109-10.

Penny was the preferred candidate to succeed Hennell, presumably due to his prior experience in the Hall laboratories and proven chemical ability. Penny's appointment would have continued the tradition of training operators in the Hall laboratories, but as he declined the post Warington was elected.[72]

The differences between Warington and his predecessor Hennell went further than their modes of appointment and previous experience. The chemical work that Warington performed in the Hall laboratories went beyond his responsibilities to the trade. During his employment as chemical operator, Warington provided chemical services for customers, benefiting from the Hall's established laboratory infrastructure. As no references exist to any arrangement between the United Stock and Warington regarding his use of the Hall laboratories for outside work, it appears likely that he was the sole recipient of the profits. Compared to the beginning of the nineteenth century, the Society no longer played a role in the provision of advice, with Warington, its employee, now consulted as the expert.

Warington frequently analysed water, chemical and mineral samples for both individuals and firms.[73] For example, Messrs Simpson, Maule and Nicholson, the dye manufacturers, often asked Warington to analyse their products.[74] Meanwhile, although the Inland Revenue Laboratory, established in 1842, was accepting samples from other government

[72] Special GCM 21 June 1842.

[73] Notebook containing experimental notes, Robert Warington Senior Papers, IACR, marked "Analysis of Water of the River Lea" (hereafter cited as IACR Warington Notebook). Experiments are identified by dates, as there are no page numbers.

[74] For example Dry and Liquid Magenta, 20.6.1861, IACR Warington Notebook. Warington also acted for the firm as a witness in patent cases. Peter Morris and Anthony Travis, "The Chemical Society of London and the Dye Industry in the 1860s", *Ambix*, 39 (1992), pp. 117-26.

departments by 1860,[75] Warington still performed analyses for the Admiralty and the India Office Stores, for example on foodstuffs and paints.[76] He was also a gas examiner to four of the metropolitan gas companies[77] and analysed the water of the River Lea when its quality was under investigation.[78] In responding to the increased utility of chemical skills, Warington supplemented his income as a chemist by performing a number of roles.[79] He typified the practising chemist, obtaining a significant portion of his income from the fees earned analysing samples or providing expert advice, whether it was in the law court[80] or to industry.

As Warington left £16,000 in his will in 1867, greater than the £3,000 left by Brande a year earlier,[81] his additional consultancy work was obviously lucrative. Warington's will is also interesting as he uses the term "professional chemist" to describe himself and in his work one sees characteristics that are later definitive of the role. His Hall salary started at £200 per annum, rising gradually to £305 in 1861, staying at this level until his retirement.[82]

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[75] P.N. Hammond and Harold Egan, *Weighed in the Balance: A History of the Laboratory of the Government Chemist* (London, 1992), p. 103. From 1861 a Customs Laboratory was also in existence.

[76] IACR Warington Notebook, entries 5.8.1863, 26.10.1864, and 20.1.1863.

[77] IACR Warington Notebook 15.7.1863, 19.8.1863 and 3.9.1863; J.H.S. Green, "Robert Warington (1807-1867)", *Proceedings of the Chemical Society*, September 1957, pp. 241-6.

[78] IACR Warington Notebook; Christopher Hamlin, *The Science of Impurity: Water Analysis in Nineteenth Century Britain* (Bristol, 1990), pp. 75-6.

[79] Russell et al., pp. 94-112; Katherine Watson, "The Chemist as Expert: The Consulting Career of Sir William Ramsay", *Ambix,* **42** (1995), pp. 143-59.

[80] June Fullmer, "Technology, Chemistry and the Law in Early Nineteenth Century England", *Technology and Culture,* **21** (1980), pp. 1-28; Christopher Hamlin, "Scientific Method and Expert Witnessing: Victorian Perspectives on a Modern Problem", *Social Studies of Science,* **16** (1986), pp. 485-513.

[81] Calendar of Grants of Probate and Letters of Administration made in the Probate Registries of the High Court of Justice in England, Warington 7 December 1867 and Brande 23 March 1866.

[82] GCM 21 June 1842; T/5, Salaries and Rentals Ledger, 1847-74.

Although it is difficult to obtain comparative data,[83] the salaries of the Hall chemical operators during the United Stock seem competitive, especially as accommodation was also provided.

Warington's multiple roles as chemical operator, consultant and expert witness were reflected in his various scientific interests. He worked on a myriad of research topics, ranging from seaweed, to microscopy, tea adulteration and volcanoes[84] all at Apothecaries' Hall, where he both lived and worked. In 1850 he demonstrated the conditions necessary for the growth of animals and plants in jars of water and was one of three men, who included the United Stock Treasurer, Nathaniel Bagshaw Ward, who could claim primacy for the development of the aquarium.[85] Warington's pharmaceutical investigations included comparing mercury and chalk preparations from Apothecaries' Hall with those from the firms Savory and Moore and Macmurdo and analysing spirit of nitrous ether and bark samples,[86] research that had both practical applications for the trade and for his work for the *Pharmacopoeia*.

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[83] Whilst information is available on academic and consulting salaries (Robert Bud, "The Discipline of Chemistry: The Origins and Early Years of the Chemical Society of London", PhD Thesis, University of Pennsylvania, 1980, pp. 58-63), comparisons are difficult, as the chemical operator's role extended beyond that of a head chemist working in a pharmaceutical firm, whilst it was non-academic.

[84] There are research notes on these topics in the Robert Warington Senior Papers, IACR.

[85] Warington's claim is subject to debate. Ward discovered the principle behind the aquarium in 1830, but did not publish. Warington published in 1851, apparently having made the discovery independently, but was also later involved in controversy with Phillip Gosse. D.E. Allen, *The Victorian Fern Craze* (London, 1969), pp. 10-16, 20-4; W.H. Brock, "The Warington-Gosse Aquarium Controversy: Two Unrecorded Letters", *Archives of Natural History,* **18** (1991), pp. 179-83; Christopher Hamlin, "Robert Warington and the Moral Economy of the Aquarium", *Journal of the History of Biology*, **19** (1986), pp. 131-53.

[86] Robert Warington Senior Papers, IACR, Notes and Miscellaneous Letters (Untitled), experiments dated 21.10.1852; Robert Warington, "On the spirit of nitrous ether and nitrite of soda", *Pharmaceutical Journal*, **7** (1865-6), pp. 7-11; IACR Warington Notebook, 6.2.1864, undated 1864 and 11.5.1865.

Whilst contributing to the 1864 edition of the *British Pharmacopoeia* and acting as joint editor with Theophilus Redwood for the 1867 edition, Warington performed experiments in the Hall laboratories. He examined the properties of "the Pharmacopoeia PO_5" (a reference to dilute phosphoric acid) and croton oil and worked on the *Edinburgh Pharmacopoeia's* Emplastrum de Minio (a tar based plaster), presumably to decide on its suitability for inclusion.[87] However, Warington's work on the *Pharmacopoeia* was the result of his reputation as a chemist, rather than from the Society's institutional role, something that is supported by the fact that his less illustrious successor did not contribute. The Society's involvement with the *Pharmacopoeia* decreased after responsibility for the new *British Pharmacopoeia* passed to the General Medical Council in 1858 and institutions such as the Pharmaceutical Society became involved in its compilation.[88]

Although there is no evidence that the Society actively encouraged Warington or the other chemical operators to undertake research at the Hall, it welcomed the reflected prestige. This boosted the image of not only its laboratories, but also its attempts to be seen as a source of pharmaceutical and chemical authority. Through the employment of its chemical operators the Society financially supported scientific activity,[89] a role that has generally been overlooked.

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[87] IACR Warington Notebook, 9 April 1861, May, June and July 1864 and October 1865. On the basis of Warington's recommendation a test for the purity of croton oil was included in the 1864 *Pharmacopoeia*, but he later discovered it was inaccurate. R Warington, "On the use of alcohol as a test for the purity of croton oil", *Pharmaceutical Journal*, **6** (1864-5), pp. 382-7.

[88] Holloway, 1991, pp. 188-9.

[89] For an analysis of the different categories of scientific patronage at this time see W.H. Brock, "The Spectrum of Scientific Patronage", in G. L'E. Turner (ed.), *The Patronage of Science in the Nineteenth Century* (Leyden, 1976), pp. 173-206.

Whilst Warington took on numerous roles and was happy to apply his chemical knowledge to any situation, in many respects his overall achievements were not as great as one would have expected from a man of his chemical abilities. This is echoed by his obituary in the *Proceedings of the Royal Society* and indicated how Morrell's "stage" of increased specialisation[90] was not yet apparent.

> Mr Warington was remarkable for his varied taste and constant activity as an observer. He may be said indeed to have passed from one subject to another with too great a facility and consequently his completed investigations bear but a very small proportion to the number of subjects that he had continually under examination.[91]

Warington was elected a Fellow of the Royal Society in 1864, late on in his career and seemingly in recognition of his past achievements in chemistry.[92] This was a contrast to Brande and Hennell who were elected following the publication of their first significant papers, with their citations noting that they were "likely to prove a valuable member".[93] Interestingly the distinction of fellowship was achieved neither by the three men's predecessors or successors. However, at this time election as a Royal Society Fellow resulted as much from possessing the right connections as from recognising outstanding scientific achievement in the reward system for best practice discussed by Morrell.[94]

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[90] Morrell, 1990, p. 983.

[91] *PRS*, **16** (1867-8), pp. xlix-l.

[92] Warington's proposers as a Fellow of the Royal Society numbered twenty-five and included almost all of the prominent chemists of the day, such as William Brande, Charles Daubeny, Edward Frankland, Thomas Graham, August Hofmann and Michael Faraday

[93] Fellow of the Royal Society Election Citations for Brande, 1809, and Hennell, 1829, Royal Society.

[94] Morrell, 1990, pp. 983-4.

However, regarding a different "stage" of professionalization, Warington was actively involved with attempts to increase the coherence of the chemical community. In 1841 he co-founded the Chemical Society.[95] This was a discipline-based learned society,[96] with members from a variety of chemical backgrounds and which reflected the growing self-consciousness and group solidarity in the subject. Brande, Hennell and Warington were all founder members of the Chemical Society and every subsequent head chemical employee at the Hall in the nineteenth century was a Fellow. Warington was also involved in the foundation of the Royal College of Chemistry in 1845[97] and in the Cavendish Society, a chemical publishing subscription club.[98] These activities reflected his desire to help unify the chemical community and integrate scientific theory and practice.[99] Although little known today, Warington was well-respected by chemists both in Britain and on the continent, corresponding with European Chemists, notably Heinrich Will,[100] and being appointed juror to international exhibitions, all of which is evidence of his wider status outside of his position as the Society's chemical operator.

The Foreman

The changes in education, activities and status that are seen in the chemical operators are also apparent, although to a lesser extent, in the role of laboratory foreman at Apothecaries' Hall. Although in the early years of the United Stock it is very difficult to

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[95] Bud, 1980; Robert Bud, "The Chemical Society – a glimpse at the foundations", *Chemistry in Britain*, March 1991, pp. 230-2.

[96] Mackie and Roberts, "Chemical Institutions" (forthcoming 2004).

[97] G.K. Roberts, "The Royal College of Chemistry (1845-1853): A social history of chemistry in England", PhD Thesis, John Hopkins University, 1973; Roberts, 1976.

[98] W.H. Brock, "The Society for a Perpetuation of Gmelin: The Cavendish Society, 1846-72", *Annals of Science*, **35** (1978), pp. 599-617.

[99] Bud and Roberts, 1984. For Warington's role see pp. 48-50.

[100] Numerous letters from Will to Warington exist in the Robert Warington Senior Papers, IACR.

identify who the foreman was, the men holding the post were soon more visible. The post of foreman had been recognised as a separate category requiring scientific instruction by the Samuelson Committee in 1868. However, the committee's definition that "foremen are almost, without exception, persons who have been selected from the class of workmen by reason of their superior natural aptitude, steadiness, and industry"[101] did not match the profile of those holding the position at Apothecaries' Hall during the 1860s.

The Hall post of foreman increasingly required greater knowledge of chemistry as a subject, in addition to practical expertise, and, whilst three foremen benefited from Warington's guidance in the Hall laboratories, at least one occupant of the post had studied under C.L. Bloxam at King's College, London.[102] From the 1840s onwards the occupants were generally members the Chemical Society,[103] probably partly due to Warington's influence, but also indicating the increased importance of chemical institutions for those practising chemistry. To a certain extent the position of foreman replaced the apothecary's apprenticeship as a training ground for the chemical operators. Both George Warington and Alexander Young Stewart held the post, prior to being appointed chemical operator (see below), whilst David Brown was foreman from 1861-64, having been sent to London

[101] Select Committee appointed to inquire into the Provisions for giving Instruction in Theoretical and Applied Science to the Industrial Classes, 1867-8 (432), XV, p. iii.

[102] R.J. Spring, "The Development of Chemistry in London in the nineteenth century: studies in the social history of chemistry", PhD Thesis, King's College, London, 1979, p. 222. Spring incorrectly identifies William Stewart as chemical operator. D.I. Davies, D.C. Lyon and R.J. Spring, "Charles Loudon Bloxam – A Victorian University and Military Academy Chemistry Teacher", *Ambix,* **33** (1986), pp. 11-32.

[103] The foremen I have identified are: J.G. Latta (1848-59) Associate Member of the Chemical Society; George Warington (1859-61) FCS; David Brown (1862-4) FCS; Alexander Stewart (1864-80) FCS, FIC; William Stewart (1868-78) FCS, FIC; Mr Dunlop (1878-81).

to gain knowledge of pharmaceutical manufacturing, before returning to the family firm of J.F. Macfarlan and Co. in Edinburgh.[104]

Conclusion

The general emergence of a professional career in chemistry can be seen in the activities of Brande, Hennell and Warington, with membership of chemical societies and the increased number of paid positions of chemical employment especially important in their practice as a chemist. Although, the identity of the chemical operator at the Hall had changed from the days of Moore and Ronalds, when operators were apothecaries whose work evolved around the pharmaceutical trade and the directions of their employers, some of Morrell's "stages" of professionalization are not yet apparent. Warington's myriad of research interests hardly corresponds with increased specialisation. Meanwhile his training, as well as that of Brande and Hennell, was based in apprenticeship and occurred too early to be affected by the development of specialist education and standardised qualifications. Consequently during the United Stock the Hall chemists' activities can be considered characteristic of a transitional period in the evolution of a professional chemical career.

Postscript: George Warington and Alexander Stewart - The Last Two Chemical Operators of the United Stock

Although Brande, Hennell and Robert Warington were the chemists with the greatest influence over the United Stock, this chapter would be incomplete without reference to their successors George Warington and Alexander Young Stewart. The employment of George Warington and his elder brother Robert in the Hall laboratory in 1859[105] resulted

[104] For biographical references see Appendix A. I am grateful to Dr Harry Payne, a former employee of Macfarlan Smith, for additional information on David Brown.

[105] GCM 4 June, 3 December 1859. Robert Junior worked in the laboratory until 1861.

from a combination of the Hall trade's tendency to find work for family members (see chapter two), and to provide extra assistance[106] to Warington Senior. The latter was required because of Warington Senior's non-trade related activities, and later on his failing health.[107] George and Robert were educated at home by their father and unsurprisingly both developed an aptitude for chemistry. Robert had a distinguished career as an agricultural chemist at Rothamsted Experimental Station.[108] George was assistant chemical operator from 1861, the only occasion this post existed, before succeeding his father in 1866.[109] George left the Society's employment in 1868 to go to Caius College, Cambridge, and, as his tenure as chemical operator was short, his impact on the Hall trade is difficult to gauge, especially as he was so greatly influenced in chemistry by his father.

Alexander Stewart was chemical operator from 1868 until the end of the United Stock in 1880, having previously been employed as foreman in the laboratories from 1864. It seems likely that this is why he was chosen in 1868, although there were other candidates, and his predecessor opposed the appointment.[110] Unfortunately information about Stewart is scarce, so it is difficult to build up a picture of his training, status and activities as a

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[106] Although the GCM does not comment about Warington Senior being distracted from his responsibilities to the Hall trade by his outside commitments, dissatisfaction with his work had occurred at his previous employers, when he was threatened with dismissal only a year after he had started. Truman Ltd, Brewers, B/THB/F/1, Clerk's Salaries, 1819-45, entry for Warington 1832, London Metropolitan Archives. I am grateful to Dr R.G. Anderson for this reference.

[107] George Warington collected the salary on behalf of his father from October 1865 to his retirement in June 1866, suggesting that his father was unable to do so. T/5, Salaries and Rentals Ledger, 1847-74.

[108] For biographical references, see Appendix A.

[109] GCM 7 December 1861, 2 June 1866.

[110] George Warington wrote to the GCM requesting to speak with them about the appointment. Although the contents of his letter are unknown, as the GCM, having just appointed Stewart, found the request undesirable, it seems likely that Warington was warning against it (GCM 5 December 1868).

chemist. His education is unknown, but as his younger brother William, Hall foreman from 1868 to 1878, studied at King's College, it seems possible that Alexander did as well.[111]

In certain respects Alexander Stewart fits into the picture of the developing chemical profession. He was elected a Fellow of the Chemical Society in 1864,[112] and although this indicated a certain standing within the chemical community it was not linked to completing a proscribed course of training. Stewart did become a Fellow of the Institute of Chemistry, founded in 1877, which aimed to introduce a benchmark for demonstrating chemical proficiency.[113] However, Stewart's election was on the basis of his established position at Apothecaries' Hall. In other respects, Stewart was quite unlike his predecessors as chemical operators. There is no evidence that he undertook any consultancy work at the Hall, whilst the Inland Revenue Laboratory[114] now carried out the chemical analyses that Warington had once performed for the Admiralty and the India Office. The absence of any publications seems to suggest little interest in research. He made no contribution to the *Pharmacopoeia*, and, if one considers the problems he caused for the trade (see chapter six), it seems possible that his chemical abilities were inadequate for the post of chemical operator.

However, Stewart's seemingly respected position in London's scientific scene provides a contrast to this picture. He joined the Royal Institution in 1873[115] and was elected a Fellow

[111] Spring, 1979, p. 222. Enquiries to the King's College archivist did not produce any evidence of either brother being educated there.

[112] There is a gap in the Chemical Society Membership Records from 1846-64, so I have been unable to locate Stewart's application form. I am grateful to Dr Robin Mackie and Ms Nicola Best for their assistance regarding the forms.

[113] Russell et al.

[114] Hammond and Egan, p. 43.

[115] Stewart elected 5 May 1873, Royal Institution Membership Forms, Royal Institution Archives.

of the Linnean Society in 1877.[116] He was described by the writer G.L.M. Strauss, who knew Stewart through their membership of a chemical symposium that met near Regent Street, as "an excellent theoretical and practical member of the craft".[117] There is also evidence of a certain social standing[118] and of possibly obtaining an income other than from chemistry.[119] However, a further contradiction arises, as despite continuing as a member of various chemical societies and listing his occupation on the 1881 census as a chemist, there appears to be no evidence of any chemical employment after he left Apothecaries' Hall. It is possible that Stewart was free to pursue his own scientific interests, without the need for a permanent income. This would have been more characteristic of an earlier age of scientific activity, yet despite the suggestion of this lifestyle he died with little money to his name.[120] From these contradictions it is difficult to compare Stewart with the other chemical operators and the main conclusion that can be drawn is that his anomalous characteristics explain some of the problems that the trade experienced during his tenure.

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[116] Form of Recommendation for a Fellow of the Linnean Society of London, A.Y. Stewart, 15 February 1877, elected 15 March 1877, Linnean Society, London.

[117] However, Strauss' s comment that Stewart was "perhaps just a *leetle* wrong-headed occasionally" and his reference to Stewart's strong political opinions could partly explain some of the problems experienced with Stewart at Apothecaries' Hall. G.L.M. Strauss, *Reminiscences of an Old Bohemian,* vol. 2, (London, 1882), pp, 106-7. Strauss also notes that Alexander's brother William had recently died of a seizure following the inhalation of potassium bromide during its manufacture at the Hall. For Strauss see *DNB.*

[118] Stewart was a member of the City Carlton Club, St Swithin's Lane; was listed in the Court Section of *Kelly's London Directory*, 1882 and his death was announced in *The Times* on 10 March 1890.

[119] Stewart was able to fund a holiday in Jersey after his departure from the Hall in Christmas 1880 until the following autumn. Letter, Alexander Stewart to James Murie, 27 October 1881, Linnean Society.

[120] The effects left to his widow totalled £43 4s 6d. Grant of Administration for A.Y. Stewart, Calendar of Grants of Probate and Letters of Administration made in the Probate Registries of the High Court of Justice in England, 1892, p. 197.

CHAPTER FIVE

The Pharmaceutical Trade at Apothecaries' Hall, 1822-1870

When the United Stock was founded in 1822, the Hall pharmaceutical trade appeared to be in a strong position, holding monopolies of supply with the Navy and the East India Company. Its strengths lay in its ability to supply large quantities of quality drugs to its customers, even at short notice, with a high standard of service. Customers generally made no distinction between the trade and the Society as a corporate body. This helped to cultivate links with government departments and validated the trade's reputation for high-quality products and service. Government custom was especially important, but Hall drugs were also supplied to the trade's proprietors to sell in their apothecary shops, to dispense to patients or for use in the institutions where they were employed, whilst the general public could purchase them from the Hall retail shop.

However, during the existence of the United Stock, the nature of the Hall trade's relationships with its customers altered. Changes in the pharmaceutical marketplace reduced the Society's privileged position in drug supply. New legislation, improved analytical tests and developments in manufacturing meant that many customers no longer found it as important to purchase from the Society to ensure drug quality, especially as its prices were high. The Society's retail trade suffered from the westward migration of its customers and changing roles for the apothecary meant that business with both proprietors and institutions diminished. Meanwhile the Hall trade was unwilling to adapt to changes in the nature of the drug market and different consumer attitudes.

Despite these changes, the Hall trade's supply of government customers remained the core of its business, even though the Navy monopoly was temporarily lost in 1823. It began joint supply of the Army in 1842 and sole supply of the Crown Agents for the Colonies from 1867. With this customer base, the fortunes of the Hall trade were inextricably linked to war. The Crimean War and the Indian Mutiny in the 1850s led to a dramatic increase in demand for Hall drugs and the proprietors' dividends rose substantially. However, away from times of conflict, income from government customers was reduced. Greater awareness of economy meant that the Society's high prices were not readily accepted and there was a shift away from monopolistic contracts. Other suppliers that could offer quality and quantity at a cheaper price were being used. This changed the nature of the Hall's relationships with certain government departments, although even at the end of the period its guarantee of quality and specialist service generated new custom.

The Hall Pharmaceutical Trade in 1822

At the time of its formation in 1822, the United Stock's trade was dominated by drug supply to two customers, the Navy and the East India Company, with the monopolies dating from the previous century.[1] The Navy business extended to the Royal Naval Hospitals in Greenwich, Plymouth and Haslar, as well as to the Royal Naval Asylum, whilst the First Fleet to Australia carried medicine chests from Apothecaries' Hall.[2] The

[1] Two sources state that the Navy monopoly was lost in 1805 (Christopher Lloyd and Jack L.S. Coulter, *Medicine and the Navy 1200-1900, vol. 4, 1815-1900* (Edinburgh, 1963), pp. 21-2; Anon., "Two Hundred Years of Naval Pharmacy", *Chemist and Druggist,* **159** (1953), pp. 586-8). However, no references to the end of the monopoly exist in the Society's records and as an average of £24,917 worth of drugs were supplied annually between 1806 and 1811 (SCA 28 February 1811), it seems unlikely the monopoly was lost in 1805.

[2] Christopher Lloyd and Jack L.S. Coulter, *Medicine and the Navy 1200-1900, vol. 3, 1714-1815* (Edinburgh, 1961), p. 53; T47/20, Treasury Various Establishments and Other Registers, Royal Greenwich Hospital, Extracts of Minutes, Salary List Bills etc 1807-20, PRO; USAB vols. 1-4; Hunting, 1998, pp. 169, 180-3.

East India Company, a trading company with the power to collect taxes in the region by means of an army,[3] was the Society's most lucrative customer in 1822. Although the nineteenth century saw a decline in the Company's fortunes,[4] the Society's supply continued. Meanwhile it appeared that government custom could increase, as the Society began negotiations with the Army about taking over its drug supply.[5]

Whilst the Navy and East India Company were the Hall trade's most significant customers in 1822, its drug supply spread across a range of government departments with requirements at home and abroad. From 1822 to 1829 drugs were supplied to a convict establishment in Australia, but the Society's market there later reduced as settlers opened up pharmacies to meet the population's requirements.[6] Other distant destinations for the Hall's drugs included the Civil Hospital in Mauritius and the Native Medical Establishment in Ceylon.[7] Meanwhile at home, the Commissioners of Customs were a continual customer throughout the nineteenth century, although on a relatively small scale.[8] At the beginning of the nineteenth century it seemed that if any government department required drugs or chemicals they would approach the Society, whilst reciprocally the Society regarded itself as a public servant through its state drug supply.

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[3] Although the East India Company was a trading concern and separate from government, as the nature of its custom was similar to that of government departments, I will discuss them together. Furthermore, after the Indian Mutiny of 1857, the Company's privileges were assumed by the British Crown and thereafter drug supply to India was arranged through the India Office.

[4] John Keay, *The Honourable Company: A History of the English East India Company* (London, 1991).

[5] E/7 Loose Papers, Box 4, Papers re Supply of Drugs to the Army, 1819-21.

[6] USAB vol. 1; Frank Hansford-Miller, *A History of Medicine in Western Australia 1829-1870,* vol. 7, "Medicine and Medical Equipment in early colonial Western Australia" (Willeton, Western Australia, 1993).

[7] USAB vol. 2. It is possible that these were early orders via the Crown Agents.

[8] Although fluctuations occurred, around £100 of supplies was purchased each year (USAB vols. 1-4).

The Society's strong business with government departments was based on the key advantages that the Hall trade could offer its customers. Some of these benefits stemmed from the Society's unique nature. Although the United Stock was the entity that administered and profited from the Hall trade, customers generally made no distinction between the trade and the Society as a corporate body. Thus the added guarantee that the Society's institutional nature brought was a significant factor in encouraging and maintaining business. The importance of the Society's corporate role to the trade was reflected in the fact that correspondence with major customers generally came from the Master and Wardens or the Clerk. As a medical corporation and livery company, the Society was a reputable organisation for governments to conduct business with and this helped to cultivate business links with government departments. The significance of influential contacts for obtaining the Navy monopoly in 1703 has been shown in chapter one and this, along with a shared gentlemanly ethos, remained significant for the Hall trade.

In addition to the advantages of the Society's unique nature, various aspects of its drug supply particularly appealed to its customers. Taking the East India Company as an example, it not only required medical supplies for an army of over 100,000 men, but also for ships, hospitals and trading posts.[9] Its drug requirements were extensive and over 600 items were listed on the East India Company indent. For example, during 1827 to 1828, 36,962 lbs of magnesium sulphate were sent to Bombay, Bengal, Madras, Canton, Fort

[9] In 1835 the Indian Army totalled 120,000, but by the Indian Mutiny it had risen to 300,000 (Philip Mason, *A Matter of Honour: An Account of the Indian Army, its Officers and Men* (London, 1974), p. 263). For the East India Company's medical activities see Crawford, 1914; David Arnold, *The New Cambridge History of India,* III.5, "Science, Technology and Medicine in Colonial India" (Cambridge, 2000), especially chapter three.

Malborough, St Helena and Prince of Wales Island,[10] raising questions about the digestive systems of the British in India. At this date it seems unlikely that firms other than the Society could meet the Company's demands. The Hall trade could also provide large quantities of drugs to its customers at short notice, which was vital in the case of unexpected military action. For example, the Society claimed in 1810 that "medicines for an Army of 30,000 men could be provided in the course of ten days in the case of an emergency".[11]

However, the Society's service to the East India Company was not restricted to basic drug supply. It could provide their entire medical requirements, thus avoiding the additional administration that using a range of suppliers would entail. The Hall refitted medicine chests for Company ships,[12] supplied bed pans, sponges and stomach pumps and repaired splints and trusses. Although the Hall trade did not manufacture these items or carry out the repairs itself, the provision of these supplies, combined with the chemical analyses performed in the Hall laboratories, meant that the East India Company received a standard of service that it was unlikely to obtain elsewhere.

A further advantage of the Society's supply was its packaging of drugs ready for despatch, which reduced customers' establishment and employment costs. It supplied bulk quantities in small amounts, so drugs were ready for immediate use on arrival, something that was especially important in military and colonial supply. One of the Army's motivations for considering the Society's supply in 1819 was that James McGrigor, Director General of the

[10] India Orders.

[11] CM 24 October 1810.

[12] OIOC, L/MAR/C/876, Stores for East India Company's own ships, sloops and hoys – original invoices 1832-4.

Army Medical Department, wanted to abolish the Army Elaboratory and thus reduce operating costs.[13]

However, none of these advantages would have been important without the guaranteed supply of quality drugs. Whilst chapter one has shown how the Society's reputation for quality was obtained, it is impossible now to judge whether the Hall's drugs were actually superior to those of their competitors.[14] However, customer satisfaction provides the best evidence. There is a complete absence of complaints about quality in the United Stock's records and government departments would not have continued purchasing drugs from the Hall if quality had been inadequate. Even after the Hall trade lost the supply of drugs to India, the India Office's Examiner of Medical Stores still praised the Society's supplies as "exceptional" and commented that the same quality could not be obtained elsewhere in the marketplace.[15]

However, this standard of drug quality and service did come at a price. As demonstrated in chapter one, the Society had a reputation for high prices in 1717 and this had increased by 1822. Although the Society was aware that its prices were higher than those of its competitors, instead of reducing them, it attempted to justify them. In the 1823 booklet about the trade, the Society argued that it was impossible for it to enter into competition

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[13] Cantlie, vol. 1, pp. 449-50. Information on drug supply to the Army through the apothecary general and the Army Laboratory in Bury Street can be found in the Fifth Report of the Commissioners of Military Enquiry (Army Medical Department), 1808 (6), VI, especially the examination of (John) Calvert Clarke, pp. 222-4.

[14] When discussing the quality of the Society's drugs compared to other suppliers, it is important to realise that we are dealing with a skewed sample of firms. Firms that sold good products were likely to expand from small pharmacies to large-scale manufacturers that can be identified today, whilst the less reputable ones were amongst the firms that disappeared and are absent from scholarly consideration.

[15] MCM 22 February 1881.

with other firms because the high prices of its drugs stemmed from their superior quality. This entailed greater costs, not only in the purchase of raw materials and adhering to the *Pharmacopoeia*, but also in the inspection and manufacturing procedures carried out at the Hall.[16] Additionally, the Society's high standard of service was labour intensive and increased running costs.

Such expenses led to higher prices as the Society based its charges on the cost of producing drugs, with different prices for different types of customer. At the beginning of the United Stock, proprietors were charged cost price for their drugs if they paid on time, a substantial discount;[17] government customers (as well as the East India Company) were charged twenty percent above cost prices; medical practitioners, hospitals and charitable institutions were charged thirty percent above cost prices, but with a discount of ten percent if they paid on time; and the retail and prescription departments set their own charges.[18]

This schedule of prices emphasises the range of customers supplied by the Hall in 1822. The Society's membership provided the Hall trade with what was effectively a captive market of medical practitioners to supply and in the 1820s this was worth an average of almost £8,000 per annum. Purchasing Hall drugs had various advantages for the medical practitioner, as they were able to deal with fellow medical men and allowed generous periods of credit. The proprietors of the United Stock were the most important part of the Society's drug trade with medical practitioners, with their custom encouraged by the

[16] 1823 Booklet, pp. 12-14.

[17] This was changed in 1825 to charging the cost price, plus ten percent and then giving a seven and a half percent discount if the bill was paid on time (GCM 1 January 1825).

[18] GCM 1 January 1823. The pricing system later became more complex (Makins' Notebook, p. 75).

discounts that they received. They purchased Hall drugs to sell in their apothecary shops,[19] and also to dispense to patients, with charging for medicines the means of obtaining a fee for the advice provided.

The Hall trade also supplied various hospitals and dispensaries.[20] For example, proprietors often purchased drugs for use at the institutions where they were employed. The Society was one of the major suppliers of drugs to St Bartholomew's Hospital during both the eighteenth and early-nineteenth centuries,[21] with supply having begun following an order in 1693 to purchase certain chemical medicines from the Hall.[22] In 1822 purchases were mostly of drugs that were difficult for the hospital apothecary to produce or where high quality was important. With a succession of Society members and stock proprietors as apothecaries at St Bartholomew's in the first half of the nineteenth century,[23] the purchase of certain drugs from the Hall was favoured.

The final group of the Society's customers in 1822 was the general public. They could obtain drugs directly from the Hall through the retail and prescription department (see chapter two). However, its clientele was hardly general, being described by the treasurers

[19] Records of the Censors' visitations of apothecaries' shops in 1809 show that of the nineteen shops visited, seven owners purchased all or the majority of the drugs from the Hall, with five purchasing some of the drugs from there (RCP Visitations, MS 2177, 20 April 1809).

[20] Unfortunately few records of purchases from hospitals survive from before the 1910s.

[21] St Bartholomew's Hospital, General Receipt Books, HB10/8-11 and 13-15 and 17, cover 1759-1784. HB10/10, 11 and 13 contain bills from Apothecaries' Hall; Dispensary Account Book D2/1 1836-59.

[22] W.S. Church, "Our Pharmacopoeia and Apothecary's Shop", *St Bartholomew's Hospital Reports,* **22** (1886), pp. 1-56.

[23] Thomas Wheeler was appointed apothecary in 1806 and was succeeded by his son Charles West in 1821, with Philip J. Hurlock holding the appointment from 1836. All three men were from families with long associations with the Society.

as "the upper classes of the population".[24] Although custom was encouraged by the Society's name and reputation for quality, the retail department did not possess the additional advantages that accompanied the Hall's supply to government customers and medical practitioners. However, its turnover of around £16,000 in 1823 was significant.

Changes in the Pharmaceutical Marketplace

Although the Hall trade was in a strong position in 1822 due to the advantages of its supply and its range of customers, the nature of its trade altered. The impact of concerns about drug quality, legislative developments, increasing competition, and changes in medical practice and consumer attitudes all had a significant impact on the pharmaceutical marketplace in which the Hall trade operated.

The Society faced increasing competition in all aspects of its trade, as chemists and druggists expanded into manufacturing and larger-scale production increased. This development was driven by a rise in demand for medical preparations. The eighteenth century witnessed "the birth of a consumer society"[25] as the acquisition of material goods, including medicines, came within the reach of a larger section of the population. Growing consumer demand for medicines continued in the nineteenth century, with sales of patent and proprietary medicines especially flourishing.[26] The requirements of new hospitals, dispensaries and charitable institutions also had to be met. Hospital expenditure on drugs

[24] GCM 1 September 1838.

[25] Neil McKendrick, John Brewer and J.H. Plumb, *The Birth of a Consumer Society: The Commericalisation of Eighteenth Century England* (London, 1982).

[26] Porter, 1989, pp. 43-55.

soared due to the increasing number of patients and the cost of items such as chloroform and antiseptics, which later became central to hospital practice.[27]

However, these developments did not boost the Hall's trade. Many of the demands for drugs lay outside of the Hall's traditional sphere of business and, as discussed in chapter two, it was an operation that was unwilling to adapt. The Society tended to concentrate on existing customers, rather than attracting new ones. It did not improve its laboratories to manufacture additions to the formulary such as quinine or chloroform and chose instead to purchase them from its competitors. It was understandable, given the poor reputation of patent and proprietary medicines, why the Society considered them unsuitable for sale in its retail shop.[28] However, unlike other reputable firms such as Allen and Hanburys, which profited from specialties such as cod liver oil, pastilles and malted foods,[29] the Hall did not develop its own branded lines even though it produced a small range of its own specially formulated products.[30] Thus although the drug market was booming, the Hall trade was in the wrong position to take advantage of this.

The character of the drug market was also changing. This was especially problematic for the Society because its supply was geared to providing large quantities of traditional medicines, such as purges and galenicals. In the nineteenth century the demand for many of these drugs declined. Whilst eighteenth-century practitioners prescribed large quantities

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[27] Keir Waddington, *Charity and the London Hospitals, 1850-1898* (Woodbridge, 2000), pp. 105-7.

[28] However, as part of its comprehensive drug supply to the East India Company it supplied both Anderson's Scots Pills and Dalby's Carminative (India Orders).

[29] Tweedale, 1990, pp. 75-81.

[30] In 1922 these included liquid paraffin, balsamic lozenges and lavender water. E/7 Loose Papers, Box 3, Memo of Agreement between the Society and Cooper and Son re sale of the Society's Retail Business, 23 March 1922.

of powerful drugs,[31] during the nineteenth century they prescribed less. In contrast to advances in medical science, as John Harley Warner has commented, therapeutics "was in a troubling state of confusion".[32] Increasing therapeutic scepticism led to a decline in the use of heroic treatments that induced violent purging and vomiting, and when these drugs were used they were prescribed in reduced doses.[33] These trends adversely affected the Society's trade as its primary market lay in these areas.

A further impact on the Society's market came in the decreasing importance that customers attached to purchasing from the Hall to ensure quality. Although guaranteeing the quality of its drugs remained a central tenet of the Hall trade, compared to the eighteenth century, this was no longer sufficient encouragement for customers to purchase its products. In addition to the technical and scientific developments that firms incorporated (see chapter three), improvements in standards were encouraged by various educational, social and legislative factors. The development of pharmacy as a profession, encouraged by the establishment of Pharmaceutical Society, was especially significant.[34] Meanwhile Alfred Hill Hassall's investigations on adulteration, published in *The Lancet* in the 1850s led to increased pressure from the public and from within the scientific community to guard

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[31] Dorothy Porter and Roy Porter, *Patients' Progress: Doctors and Doctoring in Eighteenth Century England* (Oxford, 1989), p. 158.

[32] Warner, 1980, p. 241.

[33] This trend has been best described for America. John Harley Warner, *The Therapeutic Perspective: Medical Practice, Knowledge and Identity in America 1820-85* (Cambridge, Massachusetts, 1986), pp. 91-102. A sub-committee investigating the Hall trade's problems in 1879 recognised how "the smaller quantities of drugs now used by proprietors in the treatment of disease" were partly behind the decline in business (Special GCM 1 May 1879).

[34] Stieb, pp. 144-52; Holloway, 1991.

against the effects of adulteration.[35] Legislation on the adulteration of food and drink followed and under the Pharmacy Act of 1868 the Adulteration Act of 1860 was extended to medicines. Although the lack of enforcement made this aspect of the act ineffectual,[36] it demonstrated that adulterated drugs were considered unacceptable. Furthermore, in requiring the registration of chemists and druggists, the Act underlined how the professional context of the pharmaceutical marketplace had developed.

Such changes in the wider context had a major effect on the Society's pharmaceutical trade. Not only could it purchase rather than manufacture many of the preparations that it sold, but the Society could also no longer rely solely on its reputation for quality to sell drugs. Meanwhile, the Society's premium quality drugs and medical supplies even exceeded some customers' requirements, as they considered the expense unwarranted for the intended use. Consequently cheaper products that were "quite good for all practical purposes"[37] were listed on certain indents. This establishment of two levels of quality indicated that whilst the Society prided itself on providing the best drugs possible, many of its customers preferred cheaper alternatives.

A further aspect of the changing marketplace was the increased use of advertising. Patent medicine advertising developed first, with James Morison, creator of Morison's pills

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[35] Stieb, pp. 170-80

[36] This made it an offence to compound medicines of the *British Pharmacopoeia* except according to its formularies (Holloway, 1991, p. 243). For the regulation of drug supply, especially poisons, before 1868 see S.W.F. Holloway, "The Regulation of the Supply of Drugs in Britain before 1868", in Teich and Porter, pp. 77-95.

[37] CO 54/641/10283, Colonial Office, Ceylon Correspondence vol. 7, PRO, Letter from Maurice Cameron, Crown Agents, to Under Secretary of State Colonial Office, 13 May 1897, contains report entitled "Drugs and Chemical Supply to Colonies" (hereafter cited as CA Report, 1897), quote from p. 8.

demonstrating how effective marketing had a significant effect on sales.[38] Whilst the expenditure of pharmaceutical firms did not match that of patent medicine vendors, increasingly firms realised the benefits of advertising. For example, in 1860 Allen and Hanburys advertised in newspapers, with a prominence that "would have surprised their fellow pharmacists".[39] However the Society was unwilling to engage in such activities. As a result of its status in medical licensing, it was important to the Society that its trade was portrayed as a service to the public rather than as a money-making operation. Instead the Society relied on its reputation for quality to sell products. Furthermore, as the bulk of the Hall's trade was based on established links conducted through personal contact, whether it was with government customers or medical practitioners, it seemed unlikely that advertising would assist its trading activities.

All of these changes added to the increased competition that the Hall trade experienced. This was especially important given the Society's reputation for high prices. Although a direct comparison of prices is difficult, as firms' charges were generally dependent on a variety of factors such as the quantity of drugs required and the length of credit given, the Society's prices appear to have exceeded those of other reputable firms. For example, eight pounds of confection of dog rose purchased by Allen, Hanburys and Barry from Apothecaries' Hall in 1837 cost two shillings per pound, a price so high that the compiler of the ledger inserted two exclamation marks next to it. In the same year Howards and Sons charged the firm just one shilling and two pence for three and three-quarter pounds.[40]

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[38] William H. Helfand, "James Morison and His Pills. A study of the nineteenth century pharmaceutical market", *Transactions of the British Society for the History of Pharmacy,* **1** (1970), pp. 101-35.

[39] "Visit to Messrs Allen and Hanburys' Works", *Chemist and Druggist,* **22** (1880), pp. 14-15. See also Tweedale, 1990, p. 58.

[40] Allen, Hanburys and Barry, Cost Price Book, 1824-1844, Royal Pharmaceutical Society, IRA 1997.008.

With other pharmaceutical firms selling similar quality products at lower prices, it was to be expected that the Society's market would diminish. One of the first areas where this occurred was the Hall retail trade. In the first twenty years of the United Stock, the turnover of the retail and prescription department halved.[41] However, this was not only the result of increased competition, but also because of a change in the location of London's residential areas.[42] In the mid-eighteenth century, London began to expand westwards, with the City of London becoming a business rather than a residential area. Therefore in the nineteenth century most of the Hall's target retail market lived in the West End. Medical practitioners had also moved from the City, with consultants finally settling in Harley Street in the mid-nineteenth century.[43] Instead of visiting the retail shop at Apothecaries' Hall, customers frequented shops such as Savory and Moore of New Bond Street and John Bell and Co. of Oxford Street, which were nearer to their homes and the practices of medical men. These businesses were known for their high-quality drugs, with the owners' commitment to pharmacy emphasised by their involvement in the foundation of the Pharmaceutical Society in 1841.[44]

The effect that the conservative attitudes of the GCM had on the trade's profitability can be seen in its response to the drop in retail income. In 1838 the United Stock treasurers, Henry Robinson and John Nussey, suggested that the Society should establish a retail branch in the West End. The subject had been discussed previously, but had been thought to compromise the dignity of the Society. However, Robinson and Nussey pointed out:

> But since the Bank of England, as well as other respectable public Establishments, have not thought it degrading to them, to meet the wants

[41] It stood at about £8,000 in the early 1840s.

[42] Ball and Sunderland, pp. 121, 171-3, 182, 361-2.

[43] Zachary Cope, "Harley Street", *History of Medicine,* 4 no. 2 (1972), pp. 3-9.

[44] Holloway, 1987.

and the convenience of the public in this manner, there seems no reason to think that such a proceeding would be unworthy as to the character of the Society and as there is no doubt that it would be profitable, we recommend it to the serious consideration of the Committee.[45]

Despite this request, the sub-committee appointed to look into their report concluded "it was inexpedient to make the attempt at the present time"[46] something that was characteristic of the attitude of the GCM. The proposal for a West End shop was raised on various occasions[47] but never agreed to. However, Allen and Hanburys, a firm with strong City origins like the Hall, did open a branch in the West End.[48] Unlike its competitors the Society was unable to adapt to the changing pharmaceutical marketplace and instead continued its trade as before.

Changes in medical practice also had an important impact on the Hall trade, as there was a reduction in the Society's captive market of medical practitioners. The continued shift of the apothecary into general practice eventually removed the Society's members from the shop altogether, reducing their drug requirements. Prescriptions were increasingly given,[49] so a patient could visit the chemist of his choice to acquire his medication, also taking business away from the Hall's retail trade. Meanwhile, the Society's members were increasingly less dependent on dispensing medicines to gain remuneration, as charging

[45] GCM 1 September 1838.

[46] GCM 1 January 1839.

[47] In 1845 the Clerk, Robert Upton, cast doubt on the legality of carrying on the trade away from the Hall, whilst due to the "present crisis in the medical profession", the proposal was believed to be "unbecoming and imprudent" for the Society (GCM 6 December 1845).

[48] Allen and Hanburys opened a branch at 7 Vere Street, Cavendish Square in 1884 (Tweedale, 1990, p. 83).

[49] This is also noted at the Special GCM 1 May 1879.

patients for advice gradually became more common in the mid-nineteenth century.[50] Combined with the general decrease in quantities of drugs prescribed, medical practitioners required fewer drugs in their daily practice. Consequently, the number of United Stock proprietors who purchased Hall drugs fell dramatically. Out of about 330 proprietors in 1857, only 144 were customers[51] and together they spent just under £3,000 on drugs. The GCM seemed resigned to the drop in income and only made a token effort to reverse the decline. It sent a letter to those proprietors in the vicinity of the City encouraging them to support the Hall trade and emphasised the same to new proprietors. [52]

The proprietors also bought fewer drugs for use in medical institutions. In the case of St Bartholomew's Hospital, purchases from the Hall dropped dramatically following the death in 1847 of its apothecary Philip Hurlock, a United Stock proprietor, and ended by 1860.[53] This appears to have resulted from a break in the link between the hospital apothecary and the Hall. Hurlock's successor Frederick Wood was not a member of the Society and additionally he was told to "practise economy in every possible way",[54] something that was unlikely to favour the purchase of Hall drugs. Eventually, as hospitals rearranged their medical services, the post of the apothecary was superseded and instead dispensers were employed to distribute drugs. Positions formerly held by Society members

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[50] Digby, 1994, p. 37. Although further research is required, as proprietors of the United Stock had the financial means to join the Society and become a proprietor, it suggests that they did not deal with the poorest patients, where charges for a combination of medicine and advice persisted into the early twentieth century. Anne Digby, *The Evolution of British General Practice, 1850-1948* (Oxford, 1999), p. 101.

[51] GCM 7 March 1857.

[52] GCM 7 March 1857.

[53] St Bartholomew's Hospital, Dispensary Account Books, D2/2 1860-8 and D2/3 1868-1905.

[54] St Bartholomew's Hospital Journal, 1841-7, HA1/19, 3 March 1847. However expenditure on medicines at St Bartholomew's still rose dramatically (Waddington, 2000, p. 105).

were filled by men with new pharmaceutical and medical qualifications. Hospital boards or committees now made purchasing decisions,[55] whilst more drugs were manufactured on site.[56] In these circumstances, with the link between the hospital apothecary and the Society broken, it is not surprising that its supplies to hospitals gradually diminished.

Similar changes in medical practice and administration affected the Society's drug supply to prisons. Until around 1850 prison medical care was very variable,[57] with prison surgeons responsible for providing drugs. For example, William Hutcheson Box, surgeon to Newgate Gaol and a proprietor of the Laboratory and Navy Stocks (later of the United Stock), ordered medicines from Apothecaries' Hall that totalled around £300 per annum in the 1810s.[58] However, the English prison system changed in the middle of the nineteenth century. With this a distinct professional group of prison medical officers emerged,[59] whilst centralisation of administration removed the medic's role in ordering drugs. A result of this distancing of Society members from the location of drug consumption was a reduction in demand for Hall drugs and in the accessibility of possible markets.

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[55] For an explanation of changes in the administrative structure of London Hospitals in the latter half of the nineteenth century see Waddington, 2000, pp. 135-58.

[56] T.D. Whittet, "A History of Pharmacy at University College Hospital", *Chemist and Druggist,* **159** (1953), pp. 619-22, 644-5, 670.

[57] Anne Hardy, "The Development of the Prison Medical Service, 1774-1895", in Richard Creese, W.F. Bynum and J. Bearn (eds.), *The Health of Prisoners* (Amsterdam, 1995), pp. 59-82.

[58] Select Committee on the State of Newgate Gaol etc, 1813-14 (157), IV, p.55; Select Committee on the State of the King's Bench, Fleet and Marshalsea Prisons, 1814-15 (152), IV, p. 234. I am grateful to Peter Higgins for these references.

[59] Sean McConville, *A History of English Prison Administration, vol. 1, 1750-1877* (London, 1981); Hardy, 1995, p. 60.

Government Customers

Although purchases from the general public, medical men and institutions were important, the Society's state supply was the mainstay of its pharmaceutical operation throughout the United Stock. However during this period, the Society's relationships with its government customers changed. Whilst purchasing drugs from the Society brought numerous advantages for government customers, balanced against this were the Society's high charges and the question of whether the absence of competition in supply prevented prices from being lowered. This became especially important as a concern for economy in expenditure surfaced in the process of reform moving through government departments during the nineteenth century.[60]

Although concerned more with efficiency than economy,[61] the Northcote-Trevelyan Report of 1853 initiated the discussion of government service and provided the basis for all future inquiries into departments. Gillian Sutherland has highlighted the difficulties of treating government growth in the nineteenth century as a single process, due to the varying traditions and development patterns observed in the departments. She instead describes "a series of impulses towards change and development"[62] and it is in this sequential and cumulative context that we must look at the various administrative changes taking place in the departments that the Society supplied. Although the full impact of this will be seen in chapter six, it is important to understand here the pressures placed on government departments and how this affected their trading relationships with the Society. Whilst government customers are grouped together in this thesis, different specific factors affected

[60] Oliver MacDonagh, "The Nineteenth Century Revolution in Government: A Reappraisal", *Historical Journal*, 1 (1953), pp. 52-67; Gillian Sutherland (ed.), *Studies in the Growth of Nineteenth Century Government* (London, 1972).

[61] Jenifer Hart, "The Genesis of the Northcote-Trevelyan Report", in Sutherland (ed.), 1972, pp. 63-81.

[62] Sutherland (ed.), 1972, p. 6.

their individual relationships with the Society. These factors included an increasing concern for economy, a disinclination to grant monopolies and a greater choice of suitable suppliers. Consequently the Society did not obtain government business as easily as in the past.

This was illustrated in the Society's failure to supply the Army until 1842. Despite enthusiasm from the Director General of the Army Medical Department to use the Society's supply in 1819, no contract was agreed.[63] Additionally the newly formed United Stock was dealt a major blow in June 1823 through the loss of the Navy contract "in consequence of the high prices charged by you for the medicines furnished to His Majesty's Navy".[64] Responsibility for the Navy Medical Department had been transferred to the Victualling Board in 1817. The Medical Commissioner, Dr John Weir, and the senior naval physician who assisted him, William Burnett, soon proposed a change of suppliers to economise.[65] Although the value of the contract had dropped significantly as a result of reduced naval activity, its loss came as a surprise to the Hall. The Society's response was typical, citing its historic service to the Navy, integrity and high-quality drugs in its protest to the Victualling Board.[66] The Society felt insulted at being cast abruptly aside and was concerned about how the loss of the Navy business would affect the public perception of the Hall trade.

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[63] This appears to have resulted from the presence of Calvert Clarke, temporarily appointed to replace the apothecary general in 1819. He offered to supply the Army at prices a quarter less than those of the Society and controlled supply until his death in 1842 (SCA 2 December 1819; Cantlie, vol. 1, pp. 449-50).

[64] GCM 6 September 1823 includes letter from Victualling Office, dated 27 June 1823.

[65] Lloyd and Coulter, vol. 4, p. 2; ADM 1/3530, Letters Physician General to Secretary of the Admiralty, PRO, letter dated 7 November 1833 from Sir William Burnett to Admiralty Secretary.

[66] GCM 6 September 1823.

The Society fought back against the loss of the Navy contract by printing a booklet about its laboratories and the high-quality drugs manufactured there. The GCM felt that the public had an unfavourable impression of the Society's motives for pursuing a pharmaceutical trade,[67] believing that desire for profit rather than an objective to provide genuine medicines had led to its trading activities. As the Society refrained from advertising, the booklet was the only type of publicity that it was willing to produce.[68] Three thousand copies of the booklet were printed and sent to the Society's traditional customer base, mostly government departments, medical institutions, and people whom they hoped would be influential in these areas, including the King and every member of the Houses of Lords and Commons.[69] The booklet was typical of way that the Society tried to promote its trade, emphasising its supply of quality drugs, its public service and the extensive manufacturing facilities at the Hall, in addition to providing a history of the operation. The Society always portrayed the trade in its historical context and even its price list in 1922 contained a brief history.[70] This overall approach fitted into the way that the Society conducted business with its government customers, as it drew attention to the benefits of purchasing from the Hall, without openly soliciting for business.

The impact of the booklet on the Society's trade is difficult to gauge, but as shown in chapter three, it did result in favourable publicity for its laboratories. Meanwhile the loss of

[67] Special Subcommittee of the United Stock, 30 September 1823.

[68] Although in evidence to the Select Committee on Medical Education Hennell denied that the booklet was to encourage custom, he neglected to mention that it was sent to the trade's customers and instead suggested that it was only for the Society's members (SCME III, p. 65).

[69] Special GCM 11 November 1823.

[70] E/7 Loose Papers, Box 3, Medical Price List, 1922.

the Navy contract was temporary. Reform of the administration of the Admiralty[71] led to the Society being approached about drug supply in 1833, following a formal order from the Lords of the Admiralty. The Society's initial response was unhelpful, indicating its grievances at losing the previous contract and emphasising how it would not reduce prices.[72] Regaining the naval supply appeared unlikely. The Society proposed prices that were thirty percent higher than those currently paid by the Navy, whilst an "experienced chemist" had demonstrated in 1830 that the drugs purchased from the new suppliers were as good as those from the Hall.[73] Additionally, William Burnett, now Physician to the Navy, was opposed to any change and highlighted how the Society purchased drugs from the same contractors[74] that the Navy bought from directly, leading to additional costs.

The Navy supply was only regained because the Society withdrew its opposition to entering into competition with other firms. It adopted the prices of the Navy's current contractor and also acknowledged the injustice of its former charges.[75] Returning to the Society as a supplier also brought benefits for the Navy. Following the Society's concessions over price, the monetary difference was minimal, but quality drugs were guaranteed. Additionally, the Navy would be able to abolish its dispensary at Deptford and

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[71] In 1832 the administration of the Admiralty underwent a major programme of reform to drastically reduce expenditure and in this the Navy and Victualling Boards were abolished. Roger Morris, *Cockburn and the British Navy in Transition, Admiral Sir George Cockburn, 1772-1853* (Exeter, 1997), p. 229.

[72] ADM 1/3530, letter from Edmund Bacot, Clerk, to Burnett, dated 20 June 1832, copy enclosed in letter from Burnett to the Hon. G. Elliot, 26 June 1832.

[73] ADM 1/3530, letter 7 November 1833. It is interesting that the Navy was using the services of a chemist at this date, even though apparently there was no regular technical employee.

[74] ADM 1/3530, letter 20 June 1832.

[75] ADM 1/3530, letter Burnett to Secretary of the Admiralty, 9 January 1834; letter Burnett to Secretary of the Admiralty, 23 December 1833 and note on rear (anon).

appoint an assistant surgeon instead,[76] again demonstrating how purchasing from the Society could reduce establishment costs.

The price concessions made to obtain the Navy contract in 1834 marked a distinct change in the way that the Society negotiated contracts. The change in policy appears to have been the work of John Nussey, who was later deputy treasurer and treasurer of the United Stock.[77] Nussey was Master during 1833 to 1834 and unlike many who held the post he was just thirty-nine years old on his appointment. His fresh approach to the Society's trade was a contrast to the conservative attitudes of the Court of Assistants. After his appointment as Senior Warden in August 1832[78] there was a change in approach to the negotiations with the Navy. Nussey was also influential because of his status as a royal apothecary to George IV, and later to Queen Victoria. This placed him in a strong position to negotiate on the Society's behalf with government departments and emphasises the importance of the contacts of a prominent member for cultivating business for the Hall trade.

Although the Society regained a monopoly of naval drug supply, the new Navy contract was distinctly different from the previous arrangement. Instead of charging a fixed percentage profit on the cost price, the Navy paid £11 10s for the drugs supplied to every one hundred men and boys.[79] This prevented additional expenditure by the Navy and forced the Hall to manufacture the drugs required within a price limit. Although the Society complained about the new contract system, as it brought lower profits than

[76] ADM 1/3530, note on rear of letter dated 23 December 1833.

[77] GCM 1 January 1834. For biography see Appendix B.

[78] Nussey was in line to become Junior Warden in 1832, but as the incumbent was unable to serve due his declining health, Nussey was elected immediately as Senior Warden.

[79] USAB vol. 2.

expected,[80] the Navy business was conducted without the need for expansion, payment was regular and there was hope that it would increase in time.[81]

Further evidence that the Society's monopolistic pattern of business with government departments was changing came when the Society finally began supplying drugs to the Army in 1842. The contract for drug supply was shared with another firm, Savory and Moore, whose customers included the Royal Family.[82] This arrangement aimed to minimise cost through competition, with the nearly equal division of orders between the two firms enabling "some check on the enormous expenditure annually incurred".[83] The initial business with the Army stood at around £4,000 per annum, but the supply also encouraged custom from the Royal Ordnance, Arsenal and Army Veterinary Department,[84] whilst the Royal Hospital at Chelsea had purchased drugs from the Hall since at least 1816.[85]

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[80] Profits stood at £1,100 for the whole of the first four years.

[81] GCM 1 September 1838. A rise in the charge per 100 men and increased manpower led to greater expenditure by the Navy from around 1840 (GCM 1 June 1839, USAB vol. 2).

[82] Anon., "The Story of Savory and Moore", *Supplement to the Chemist and Druggist*, 18 November 1967, pp. 19, 21-2.

[83] CO 54/429/9030, Ceylon Correspondence, vol. 6, 1867, Supply of Drugs and Medical Stores, 14 September 1867.

[84] At the beginning of the 1850s the Ordnance purchased drugs worth about £2,000 a year from the Society, before ordering was transferred to the Army Medical Department in 1854. Select Committee on the Medical Department of the Army, 1856 (331), XIII, pp. 215-16. The Arsenal was supplied from 1852-7 and the Veterinary Department from 1849-94 (USAB vols. 3 and 4).

[85] USAB vols. 1-4; WO 245/38, Apothecaries' Contingent Account, Chelsea, 1816-96, PRO; C.G.T. Dean, *The Royal Hospital Chelsea* (London, 1950), p. 112.

With the Army and Navy as major customers, the Hall trade's turnover greatly increased in times of conflict. The outbreak of the Crimean War caused a massive increase in demand for drugs from the Army, with a peak of over £40,000 reached in 1855, while expenditure by the Navy almost doubled to just under £8,000 (see Graph B in Appendix D). Although the Society despatched large quantities of medicines to the front little arrived. Inadequate medical provision in the Crimea led to the appointment of a Select Committee and the reorganisation of the Army Medical Department, but this did not affect the Society's drug supply.[86]

The East India Company was also frequently engaged in military action, as it sought to increase and later defend its position in India, so its orders were subject to similar fluctuations. Through the 1830s and 1840s, orders ranged from £10,000 to £20,000, but greater military activity during the 1850s, culminating in the Indian Mutiny of 1857, caused requirements to increase substantially. The value of drug supplies peaked at over £50,000 in both 1856 and 1859 and was around £40,000 in 1857 and 1858.[87] Combined with the increased demand from the Army as a result of the Crimean War, the trade's proprietors benefited from abnormally high dividends during the 1850s, with first class proprietors receiving over £100 on their share in certain years (see Graph A in Appendix D).

Outside times of conflict, the income from the Navy and the Army was lower than the Society would have expected from a military contract at the beginning of the century. This was a consequence of a move away from the truly monopolistic contracts that had once

[86] The only recommendation made about stores was that separate transport should be provided. Select Committee on the Medical Department of the Army, 1856 (331), XIII, p. iv.

[87] The pre-mutiny peak in 1856 resulted from an accumulation of business, and, in anticipation of increased military requirements after the Mutiny, an order for £24,000 of drugs was made in 1858 (GCM 5 June 1858).

been the mainstay of the Hall trade. Although naval expenditure on drugs stood at around £6,000 in the 1850s and 1860s, accounting for about ten percent of the Hall trade's turnover, this was quite different from the days of the Navy Stock when naval business had dominated the trade. Meanwhile, with the exceptions of 1859 (£10,318), 1860 (£22,793) and 1878 (£11,962), the gross value of the Army contracts was never again higher than £10,000, and reverted to the usual level of around £4,000 per annum.

Despite the decrease in the relative importance of naval business, the unique nature of the Hall trade still had a significant appeal to government customers, even generating new custom from the Crown Agents for the Colonies in 1867. The supply of the Crown Agents indicated the way that the Hall trade would develop after 1880. This would entail the supply of a niche market, with customers prepared to pay a premium for what the Society could provide – high-quality drugs and a high standard of service.

Although the Indian Mutiny led to the demise of the East India Company, this did not result in the loss of a valued customer. The strength and tradition of the Society's supply, combined with the continuity in Indian administrative control,[88] led to the Council of India continuing the trading relationship. However, in the remaining years of the United Stock, the Council of India's spending fluctuated significantly. For example, orders dropped from almost £50,000 in 1861 to under £2,000 in 1862 (see Graph B in Appendix D). This suggested that the Society's monopoly was not as secure, although orders still rose sharply during the Abyssinian War of 1867.

[88] Donovan Williams, "The Council of India and the Relationship between the Home and Supreme Governments, 1858-1870", *English Historical Review,* **81** (1966), pp. 56-73.

The full impact of the change in the trading relationship between the Society and the Council of India is discussed in the following chapter, but evidence from the bimonthly returns of the Director General of Stores[89] provides a valuable insight into the operation of the Hall trade and the advantages for government departments of using its supply, even in the latter years of the United Stock. In April 1869 virtually all of the drug requirements for the three presidencies of Bengal, Bombay and Madras were purchased from the Hall. This ranged from hundreds of pounds of drugs such as magnesium sulphate and cod liver oil to a few ounces of brucine,[90] with larger quantities supplied on other occasions.[91] In 1869 the most important drug not to be ordered from the Hall was quinine, as Howards and Sons had taken over its supply in 1866.[92] Howards was renowned for its production of quinine, whilst the Hall laboratories did not manufacture it. However, in addition to drugs and medical sundries, the Hall trade supplied chemicals to the India Office. These included not only small quantities of reagents for use at the Lahore Medical School, but also five

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[89] OIOC, Bimonthly returns by the Director General of Stores, India Office

L/AG/36/1/1 April 1869	/5 February 1873	/9 April 1877
/2 October 1869	/6 February 1875	/10 June 1877
/3 February 1871	/7 October 1875	/11 June/July 1889
/4 February 1872	/8 February 1876	

Hereafter cited as Stores Report 1 etc.

These reports provide the basis for my discussion of the India Office supply in chapters five and six. Each return covers a two-month period, which ends in the month referred to, and includes all the orders being processed at the time. As only selected months exist, it is possible that the surviving records reflect either a lull or peak in orders, which was atypical of the whole year. However, they are valuable for establishing general trends in requirements and suppliers used.

[90] Stores Report 1.

[91] Orders in October 1869 included 11,817 lbs of magnesium sulphate and 2,549 lbs of cod liver oil (Stores Report 2).

[92] Howards and Sons Quinine Book, 1861-1908, Redbridge Local Studies and Archives Service.

hundredweight of borax for the Kurrachee Harbour Works, bismuth for the Bengal Mint, and 850 lbs of nitric acid for a small armaments factory.[93]

The trading relationship was based on the Society's longstanding business dealings with the Indian governing classes and its experience in dealing with the special requirements of the region's supply. Additionally, the India Office benefited from a reduction in administration, as the Hall provided all of its chemical and medical requirements in one contract. It was therefore unnecessary to purchase from a range of suppliers, which would have entailed managing numerous contracts and co-ordinating various dates of despatch. The reduction in administration was especially important because the India Office's ordering process was very laborious. A typical example is the order placed by the Bombay Presidency in December 1868. It was not received in the India Office Store Department until July 1869. A contract for supply was finally made with the Society of Apothecaries on 8 September 1869, leading to an estimated date of despatch a year after the original indent was made.[94]

The guaranteed supply of high-quality drugs, a high standard of service and the benefits of using the same supplier were even more crucial for the Crown Agents for the Colonies, who began to purchase Hall drugs in 1867.[95] The Society also provided medical stores, although unlike supplies to India, larger quantities of chemicals were obtained from Howards.[96] In making the case for using the Society as its only drug supplier, the Crown Agents dismissed protests about costs and examined the practice of the India Office,

[93] Stores Reports 1 and 5.

[94] Stores Report 2.

[95] CO 54/429/9030 Ceylon Correspondence, vol. 6, 1867, draft of letter from Richard Grenville, Duke of Buckingham and Chandos, to the Crown Agents, 26 September 1867.

[96] CO 54/429/9030, letter 26 September 1867.

Admiralty and War Office, with their precedence of Hall drug purchase a major factor behind the Agents' choice.[97]

The Crown Agents were created in 1833 and as the number of colonies they served increased during the nineteenth century, so did the Agency's importance.[98] The Agency existed as purchasing and financial agents for the colonies and survived by charging commission on orders. Their monopoly of business included the supply of all stores that could not be produced in the colony, the organisation of loans and overseeing the development of new infrastructure such as railways.[99] The Agency was an unusual organisation as it was not part of the government machine or civil service, but was a "semi-autonomous body under the general supervision of the Colonial Office".[100] This status was reflected in its independence when dealing with the Society of Apothecaries, as it could afford to a pay a premium for the type of service that the Society provided. The Crown Agents were not subject to the financial constraints that increasingly affected the Navy and Army[101] and, as one percent commission was levied on all orders, the Agency benefited financially from purchasing expensive goods.[102]

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[97] CO/54/429/9030, Supply of Drugs and Medical Stores, 14 September 1867.

[98] A.W. Abbott, *A Short History of the Crown Agents and their Office* (London, 1959).

[99] The workings of the Crown Agent Office are thoroughly explained by David Sunderland in "Principals and Agents: The Crown Agents for the Colonies 1880-1914", DPhil Thesis, Oxford University, 1996. His analysis of the agency has provided the background to my work. See also Richard M. Kesner, "The Builders of Empire: The Role of the Crown Agents in Imperial Development, 1880-1914", *Journal of Imperial and Commonwealth History,* **5** (1977), pp. 310-30; David Sunderland, "Principals and Agents: The Activities of the Crown Agents for the Colonies", *Economic History Review,* **52** (1999), pp. 284-306.

[100] Richard M. Kesner, *Economic Control and Colonial Development: Crown Colony Financial Management in the Age of Joseph Chamberlain* (Oxford, 1981), p. 60.

[101] By 1870 the Treasury relinquished control over the non-Imperial aspects of colonial finance (Ann M. Burton, "Treasury Control and Colonial Policy in the Late Nineteenth Century", *Public Administration,* **44**

When arranging supplies for the colonies, the Crown Agents preferred to deal with a restricted list of firms, rather than inviting tenders for goods.[103] These methods of non-competitive purchase were ideal for the Hall trade as it meant a return to the monopolistic contracts that had previously been the mainstay of its government drug supply. The Crown Agents awarded monopolies as they considered it impractical to divide indents between a few firms and pick out the cheapest items from each. This was seen to jeopardise quality, lose the advantages gained from large dealings and lead to inconsistency in supplies.[104] The purchase of high-quality merchandise was crucial for the Crown Agents as it was essential to their reputation that goods arrived in excellent condition and as specified, otherwise complaints from the colonies and reprimand from the Colonial Office could arise.[105] By purchasing drugs from the Society any concerns over quality were removed.

The Society's specialist supply was also important due to the difficult and specific requirements of the Agency's orders. They wanted the Society to supply bulk quantities of drugs packaged in small amounts. For example, one order from Ceylon comprised no less than 13,330 parcels,[106] something that required considerable labour. Additional difficulties

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(1966), pp. 169-92) and until 1905 the Colonial Office Audit ensured only that money was spent for sanctioned purposes and did not question the size of expenditure (Sunderland, 1996, p. 32).

[102] Sunderland, 1996, chapter two.

[103] David Sunderland, "Objectionable Parasites: The Crown Agents and the Purchase of Crown Colony Government Stores, 1880-1914", *Business History,* **41** no. 4 (1999), pp. 21-47. However some of Sunderland's generalisations about the purchase of stores, such as a decline in quality, mistakes in orders and established packing and inspection procedures, do not apply to the Society's supply of the Crown Agents.

[104] CO 54/429/4057, Ceylon Correspondence, vol. 6, 1867, Crown Agents to Sir Frederick Rogers, 24 April 1867.

[105] Sunderland, 1996, chapter three.

[106] CA Report, 1897, p. 3.

arose from fluctuation in demand. This resulted in further costs for the Hall trade, as it had to keep a sufficient staff to be able to deal with sudden influxes of colonial orders.[107] The Society also had to take special care when packing orders for distant destinations.[108] As the Society was one of the few firms that could fulfil the Crown Agents' exacting requirements business quickly increased, leading to an annual expenditure of around £7,000 in the United Stock's final years. Indeed demand from the Agency actually grew after the dissolution of the United Stock, in sharp contrast to the situation with other government customers.

Conclusion

The Hall's drug supply to the Crown Agents and the India Office showed that there was still a market for its high-quality drugs and especially its specialist level of service. Additionally, although there were changes in the format of supply, both the Navy and Army valued the Society's service and remained customers. Commenting on the Society's supply in 1867, the Navy stated that the arrangements are "deemed advantageous to public service, both on the score of the quality of drugs supplied and the price paid for them".[109]

Despite the advantages of the Society's drug supply, changes in legislation, consumption and medical practice had affected demand for Hall drugs. Faced with increased competition, the Society could no longer rely on drug quality to sell its products, especially as its prices were high. Whilst the nineteenth century saw a boom in demand for drugs, the character of the market changed. Meanwhile the Society failed to adapt its trading

[107] This reason is given for the refusal to reduce the number of staff employed (Special GCM 1 May 1879).

[108] The Society's superior packing was demonstrated to the Crown Agents when a case containing turpentine was thrown twice from a considerable height onto flagstones, but remained unbroken (MCM 18 March 1902).

[109] CO54/429/9030, Supply of Drugs and Medical Stores, 14 September 1867.

operation to these conditions and purchases from medical practitioners, institutions and through its retail department decreased.

Although these factors reduced demand for Hall drugs, while purchases from government departments remained strong and conflict led to sharp increases in turnover, the Hall trade remained relatively successful. This situation was to change dramatically during the 1870s. In the final decade of the United Stock, concerns for financial economy amongst government departments and the introduction of new purchasing methods led to fundamental changes in the Society's trading relationships with its oldest customers. Combined with the cumulative effect of the changes in the pharmaceutical marketplace, this resulted in fundamental problems for the United Stock.

CHAPTER SIX

The 1870s: Increased Problems for the Hall Trade

During the first fifty years of the United Stock, although the Hall trade was sustained by its supply of government customers, the changing pharmaceutical marketplace meant that it no longer occupied the privileged trading position that it had held in the eighteenth century. As the GCM was unwilling to adapt the Hall's trading practices, it failed to take adequate action to reverse a decline in demand for Hall drugs. However, it was only during the 1870s, when further problems arose, that the cumulative effect of these difficulties was apparent.

The most serious problem facing the trade in the 1870s was the loss of important government customers. This resulted from increasing customer concerns regarding the cost of the Society's drugs and subtle changes in government administration, combined with rising competition in the pharmaceutical trade. The subsequent reduction in profits and therefore dividends diminished proprietors' support for the United Stock. Meanwhile, the Hall trade's problems were compounded by poor management and the constraints placed on it by the Society's tripartite nature.

Loss of Government Customers

The temporary loss of the Navy monopoly in 1823 and changes to the format of the Society's monopolistic business indicated that the Society's traditional business with government departments was not guaranteed to continue. During the 1870s the impact of reform on government departments led to subtle administrative changes which introduced new methods of purchasing and inspection. These methods led to a change in government

customers' attitudes to using other suppliers, as drugs could be purchased at cheaper prices without jeopardising quality. Meanwhile, this atmosphere of increased checking and greater awareness of expenditure was quite different from the way that the Society conducted its trading operation. Although different factors affected the Hall's relationship with individual government customers, by examining the end of its drug supply to the Navy and the India Office the factors behind the dramatic downturn in the Society's trade can be explained.

In June 1870 the Lords of the Admiralty declined to accept the Society's tender for supplying drugs to the Navy.[1] Given their satisfaction with the Society's service in 1867 (see chapter five), this decision apparently came without any warning. However, in contrast to its anger on losing the Navy monopoly in 1823, the Society seemed resigned to its fate, attributing the decision to "the pressure placed upon them (the Admiralty) by the public departments of state and the competition of other establishments".[2]

Whilst a member of the medical profession had responsibility for purchasing naval drugs, the Society's supply had seemed relatively secure.[3] There was also minimal treasury control over naval purchasing, as both the Admiralty and the War Office were known for their large expenditure, the control of which Maurice Wright has described as "the Treasury's largest and most difficult task".[4] However, this situation did not continue. Throughout the 1860s a series of enquiries led to reform in the internal administration of

[1] GCM 4 June 1870.

[2] GCM 4 March 1871.

[3] William Burnett had remained in this role until 1854, although his appointment changed to Director General of the Navy Medical Department in 1843. His successor was Sir John Liddell, until 1864, and then Dr Alexander Bryson, until 1869 (Lloyd and Coulter, vol. 4, p. 2).

[4] Maurice Wright, *Treasury Control of the Civil Service, 1854-74* (Oxford, 1969), p. 344.

the Admiralty and its methods of accounting.[5] Sir Alexander Armstrong was appointed Director General of the Navy Medical Department in 1869, but in 1868-9 a reorganisation had taken place creating a Contract and Purchasing Department. The Director General's purchasing powers were transferred to the head of the new department, the Superintendent of Navy Contracts,[6] thus reducing medical influence on supplies. This change broke the Society's advantage of conducting business with a medical man who was known to the Hall. Additionally, increased parliamentary control through the activities of the Public Accounts Committee and the extension of the Navy Accountant General's powers to cover stores and victualling in 1869, helped to influence attitudes to spending. This culminated in an acknowledgment by the War Office and Admiralty in 1870 that the Treasury had authority to control their expenditure.[7]

In an atmosphere where old ties had been broken and increased parliamentary and treasury control existed, there was a greater desire to reduce expenditure. There was also a belief that the contract system should be fairer, all of which broke the tradition of the Hall's supply. In the following years, competitive tendering for Navy contracts became more widespread, with an emphasis on obtaining the lowest prices.[8] Due to the expense of the Society's drugs, it would always lose out when they were compared directly with other

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[5] William Ashworth, "Economic Aspects of late Victorian Naval Administration", *Economic History Review,* second series, **22** (1969), pp. 491-505.

[6] R. Vesey Hamilton, *Naval Administration: The Constitution, Character and Function of the Board of Admiralty and of the Civil Departments it Directs* (London, 1896), p. 133.

[7] For the Public Accounts Committee see F.B. Chubb, *The Control of Public Expenditure: Financial Committees of the House of Commons* (Oxford, 1952), pp. 23-41. For the Accountant General, see Hamilton, 1896, p. 125. On Treasury authority, see Wright, p. 344.

[8] The Admiralty laid down a "general scheme for the purchase of stores" in 1883. Supplies were to be obtained by public tender, except when needed in small quantities or where quality was important, and in these cases limited competition would be used (Hamilton, 1896, p. 134).

firms. The Navy had rejected the Society as drug suppliers due to cost in 1823, so it was to a certain extent predictable that the Navy would be the first state department to terminate its trading relationship with Apothecaries' Hall.

After losing the Navy supply in 1870, the following year brought further problems for the Hall trade. The Army and the India Office experienced major delays in drug supply, which left the Society in danger of losing further business. Thomas Logan, Director General of the Army Medical Department stated that unless all requisitions were despatched immediately "I shall reluctantly be compelled to withhold issue to you of all further orders until those now in your hands have been completed".[9] This is the first reference to the Hall trade being criticised for reliability, and even Logan describes the delay "as very unusual". However, once the Society had despatched the orders, business continued with the Army as before.

The effect on the Hall's relationship with the India Office was more complex. The 1860s had seen orders fluctuate significantly and Howards and Sons had taken over the supply of quinine to India from the Society in 1866 (see chapter five). Although Indian drug orders from the Hall increased to over £40,000 in 1874, they dropped to around £26,000 in 1875, indicating the India Office's willingness to use other suppliers. In October 1875 carbolic acid, previously supplied by the Hall, was now ordered from Calvert and Co., medicine chests came from the General Apothecaries Company and drugs for the Mysore Principality were purchased from Wright, Sellers and Co.[10] Supplies to India dropped dramatically in 1877, with the Hall trade's gross income from the India Office falling to only £3,500. The bi-monthly returns for April and June 1877 clearly illustrate the loss of

[9] GCM 2 January 1872.

[10] OIOC, Bimonthly Returns by the Director General of Stores, India Office, L/AG/36/1/7, October 1875, Stores Report 7. See p. 150 for a full explanation of these archives.

business. Laboratory chemicals now came from Townson and Mercer and most medical sundries were no longer purchased from the Society. The majority of drugs came from Barron, Harvey and Co. or Howards and Sons, with only the occasional item ordered from Apothecaries' Hall.[11]

In May 1879 the report of a sub-committee investigating the United Stock noted that the orders from the India Office had been lost.[12] This was confirmed by an expenditure of only £355 by the Office on Hall drugs in that year. However, as shown in chapter five, relatively recently the India Office had been very happy with the Society's supply and required its specialist service. This situation changed as the India Office found an alternative method of achieving the same outcome that the Society's service provided. The creation of a new inspectorate post in the India Office Store Department in 1879 enabled the Office to use inspection to ensure that quality drugs were supplied. This provided an alternative to relying on the Society's expensive guarantee of quality and enabled drug contracts to be opened up to greater competition.

The new post of Examiner of Medical Stores was held by Francis MacNamara, who possessed the necessary expertise, having obtained extensive chemical experience in India.[13] Although MacNamara held a favourable personal opinion of the Society's drugs,[14]

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[11] Stores Reports 9 and 10.

[12] Special GCM 1 May 1879.

[13] MacNamara had been Professor of Chemistry at the Calcutta Medical School, Chemical Examiner to the Indian Government and had promoted schemes for water purity in the country. *BMJ*, 11 March 1899, pp. 635-6; Mark Harrison, *Public Health in British India: Anglo-Indian Preventative Medicine, 1859-1914* (Cambridge, 1994), p. 103; D.G. Crawford, *Roll of the Indian Medical Service* (London, 1930), p. 141.

[14] MacNamara was approached in 1881 about the India Office returning to using the Society's drug supply. In the interview he stated how he "personally wished to do business with us from his own knowledge of his

the fact that all drugs had to pass before an inspector changed the way that the India Office arranged drug supply. The Hall had always felt justified in charging a premium for its drugs, as its customers knew they would receive a quality product. However, the India Office could now invite tenders for drug supply, choose the most reasonable price and check quality through inspection. The effect on the Society's business was demonstrated when it attempted to regain some of the India Office business by responding to a tender with "as low a figure as would be consistent with a small profit only".[15] Although some orders were initially obtained,[16] by the end of 1882 the Society received no more, indicating how it was unable to compete on terms of price with other firms.

The use of inspection reflected a general trend in government and the civil service to engage the services of specialists[17] and by the 1890s the Army, Navy and India Office all utilised the facilities of the Inland Revenue Laboratory[18] for testing supplies. However, the India Office used inspection to a greater extent than the Army and Navy Medical Departments or the Crown Agents, which found it impractical. Drug inspection was easier for the India Office than for other government bodies[19] due to changes in its methods of ordering. When the Society had supplied the India Office orders were fairly random and varied in size. By the end of the century, Indian drug orders consisted of four large annual indents, one from each Presidency. These were shipped in large consignments, which made drug inspection easier. This procedure contrasted particularly with that of the Crown

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being able to depend upon our examination of the drugs and thus really to save his care in the matter". MCM 22 February 1881.

[15] MCM 28 June 1881.

[16] MCM 4 August, 18 October 1881.

[17] Roy MacLeod (ed.), *Government and Expertise: Specialists, administrators and professionals, 1860-1919* (Cambridge, 1988).

[18] Hammond and Egan, p. 137.

[19] CA Report, 1897, p. 7 and p. 9.

Agents. The Agents dealt with multiple, individually packaged orders to numerous colonies, which made inspection impossible, and it did not chemically test drugs until the twentieth century.[20] Consequently the Crown Agents continued purchasing drugs from the Hall, as they needed the Society's specialist service to fulfil their requirement for quality.

However, factors other than the introduction of drug inspection encouraged the increased use of competition when awarding India Office drug contracts. Treasury control of finances was less important than in the case of the Navy, as Parliament "rarely concerned itself in the accounts of India Office expenditure".[21] Instead subtle administrative changes were important. Although in the early years of the Office the residual influence of the East India Company was significant, gradual changes to its administration were occurring. Charles Wood, Secretary of State for India (1859-66), placed Thomas Baring, Parliamentary Under Secretary from 1859 to 1864, in charge of financial affairs and Baring began an investigation into the high price of supplies.[22] Following the creation of a Stores Committee of the Indian Council in 1874,[23] changes occurred in the Stores Department. In addition to creating the post of Examiner of Medical Stores in 1879, A. Abercrombie Jopp became the Director General of Stores, continuing a trend of new appointments. The implementation of professional standards and regular operating procedures increased, distancing the Society from its monopolistic position and the gentlemanly links that it had held with the East India Company.

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[20] The Crown Agents began to use the government laboratory in the 1910s (Hammond and Egan, pp. 137-8), although it was not until 1922 that the Agents carried out their own limited drug testing (Crown Agents for Overseas Governments, CAOG 16/25, Stores Inspection Branch, 1904-52, PRO, Draft Memorandum to Under Secretary of State, 1929).

[21] Arnold P. Kaminsky, *The India Office, 1880-1910* (London, 1986), p. 105.

[22] Donovan Williams, *The India Office, 1858-1867* (Hoshiapur, 1983), p. 157.

[23] Kaminsky, p. 52.

The combined loss of business from the Navy and the India Office saw the Hall trade's average annual profits drop from £10,939 during the 1860s to £4,433 during the 1870s. In addition to the financial impact, the end of this custom dealt the United Stock a major psychological blow. Naval and Indian supply had been the main occupation of the Hall trade for over one hundred and fifty years and many proprietors felt that if these two customers purchased drugs elsewhere, the trade's role as a public servant had a limited future. Meanwhile the atmosphere created by greater customer awareness of expenditure, the introduction of competitive tendering and the use of inspection to ensure drug quality marked a distinct departure from the way that the Society carried out its trading operation. Although business with the Army and Crown Agents continued, this only brought in around £11,000 per annum. This was inadequate to sustain the Hall trade when income from proprietors, the retail department and hospitals had also dropped (see chapter five). Furthermore, problems with the trade's operation and management were fuelling demands for change to the United Stock.

An Enquiry into the Hall Trade, 1871-2

The threat of losing the Army and India Office business in 1871 when the Society did not despatch their orders on schedule was only one of the problems that the Hall trade experienced at this time. It was suspected that a loss of £100 per annum had been sustained for the past three years in the manufacture of bismuth preparations, whilst trade correspondence had been dealt with incorrectly and high prices were deterring custom.[24] This crisis led to the appointment of a committee of enquiry to investigate the working of the wholesale department and laboratory in December 1871. In contrast to the inactivity of many other committees appointed by the GCM, the enquiry highlighted both long-term

[24] GCM 2 January 1872.

deficiencies in the Hall trade's administration and immediate difficulties caused by the actions or failings of certain personnel.

The operation of the laboratory was especially problematic, with Alexander Stewart, the chemical operator, apparently responsible. The loss made on bismuth preparations had resulted from the accumulation of large stocks of impure bismuth carbonate and indicated a neglect of stock-keeping. A breakdown in record-keeping had also occurred. Although being "unusually busy with urgent colonial orders"[25] was the official explanation for the delays in government orders, they had been partly caused by Stewart. He had been sanctioned to open letters relating to public service drug supply, but had failed to pass them on to the accountant, lay them promptly before the buying committee, or record them. Additionally, as the Hall trade was aware of the colonial orders before it received those from the Army and the India Office, the inability to complete them on time seemed to result more from mismanagement than the pressure of business. The committee of enquiry concluded that the entire manufacturing department was lacking in "authoritative superintendence" and that there was "a want of method and accuracy in the records of the various operations".[26] It appears that Stewart was unable to adapt to the greater administrative and managerial responsibilities that his position as chemical operator now included.[27]

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[25] Letter from J. Simoens, treasurer to T.G. Logan, Director General of Army Medical Department, 10 October 1871 (GCM 2 January 1872).

[26] GCM 2 January 1872.

[27] The increased managerial role for the chemist will be discussed in chapter eight. Despite the problems highlighted in 1872, Stewart received a salary increase in 1875, along with the accountant and head of retail, and their services were collectively described as valuable (GCM 1 January 1875).

However, Stewart was not the only cause of the trade's difficulties, as it appears that the failings of the treasurer, Jeronimo Simoens,[28] were also significant. For example, the breakdown in dealing efficiently with government orders resulted from Simoens sanctioning Stewart, rather than the accountant, to deal with the correspondence. Although, given the selective nature of the Society's minutes, one would not expect to find criticisms about a senior member of the Society,[29] Simoens' tenure as treasurer suggests that reservations about his capabilities existed. Simoens was the only treasurer to be appointed following an election, as typically the deputy automatically succeeded the outgoing treasurer.[30] Additionally, as a result of the investigation into the trade's problems, in 1871 the usually nominal election for treasurer was delayed. When it was held in 1872 Simoens found himself facing a contested election, the first occasion that this had occurred to a sitting candidate. As a verdict on his performance as treasurer, Simoens was voted out of office and replaced by Henry Morley, Master in 1870-1.[31] Even in 1879 the buying committee protested about a tendency "to visit upon the present the errors of the past generation",[32] presumably a reference to the mismanagement in the early 1870s.

The actual position of treasurer was also causing problems for the Hall trade. The system of management by committees and treasurers, set up in the 1822 Deed was both complex and costly. It was designed to ensure a double check on the trade's activities, but generally

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[28] For biography see Appendix B.

[29] Neither Stewart nor Simoens were personally blamed by the 1872 Committee of Enquiry, although the lack of superintendence in the manufacturing department, which was Stewart's responsibility, was mentioned twice.

[30] SCA 4 February 1868.

[31] CM 9 January 1872. Despite the circumstances surrounding his departure, Simoens was given 100 guineas and thanked for his services (GCM 2 March 1872).

[32] E/7 Loose Papers, Box 6, Address of the Members of the Buying Committee to their Co-proprietors of the United Stock of the Society of Apothecaries, undated but written between June and December 1879.

it failed to provide effective management. By the 1870s a breakdown in supervision had occurred. A lack of continuity in the post of treasurer was a further problem. Following Simoens' departure as treasurer in 1872, three men held the position until the dissolution of the United Stock: Henry Morley, 1872-7, Richard Stocker, 1877-8 and Willington Clark, 1879-80. This was an unprecedented number of changes in such a short period. Not only did this lead to discontinuity in management, but whereas the post of deputy treasurer had previously acted as a training ground for the senior position, these men spent little or no time employed in the junior role.[33] Additionally, compared to the energy and enthusiasm devoted to the post by previous occupants, the role was now something pursued by the most senior members of the Society during their retirement. At the beginning of the United Stock the drug trade was relevant to a treasurer's activities as an apothecary, but now this aspect seemed only a legacy of a previous age. Thus by the 1870s, having an apothecary as the general manager of the Hall trade was even less appropriate than in 1822. In this context, it is not surprising that the treasurers failed to adequately perform some of their responsibilities.

Although the enquiry held in 1872 made no alteration to the role of treasurer, it recommended a number of administrative and operational changes. To prevent delays with orders, all correspondence would be opened and distributed by the accountant, rather than Stewart. The specific duties of the head employees were defined so that each was aware of the requirements of his post. Inadequate supervision had been a major theme of the enquiry and this was tackled in two ways. Firstly, members of the sub-committees would visit the laboratories, warehouses and packing rooms weekly, and secondly, a specific member of the GCM was appointed "to exercise constant supervision over the entire working

[33] Henry Morley did not hold the post of deputy treasurer, Richard Stocker held it between 1872-7, and Willington Clark between 1877-8.

department and shall be responsible for its efficiency".[34] As noted in chapter four, this post was given to Edward Bradford, but, unlike his forerunner William Brande, the provision of chemical advice was not part of his remit. It appears that the GCM hoped that a frequent presence in the trade would ensure adequate supervision of the employees and counteract the treasurer's reduced participation in operational matters. However, with the exception of his re-appointment each year, Bradford is scarcely referred to in the minutes of the GCM. This suggests that his contribution to the trade was minimal, whilst the continued problems with the trade's management indicate the ineffectuality of the appointment. Consequently the 1872 Enquiry's various recommendations had a minimal impact.

Continuing Problems for the Hall Trade

Although the decline in government custom and the trade's operational difficulties were especially characteristic of the 1870s, many of the other problems experienced during this decade had a long history. The Society had always possessed a reputation for high prices. Whilst it had previously justified this through the superior quality of its drugs, this was no longer as viable because reputation was no longer the primary criterion of quality. The 1872 Enquiry highlighted how the Society's high prices were deterring custom and this led to price revisions in an attempt to increase business.[35] However, in 1874 a non-proprietor complained about the 47.5% profit made on cost prices,[36] which forced further reductions.[37]

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[34] GCM 2 January 1872.

[35] GCM 2 January 1872; Makins' Notebook, p. 76, gives details of the scheme.

[36] This was subject to a ten percent discount if bills were paid on time.

[37] The percentage profit on cost prices was reduced to 35%, with a 5% discount for non-proprietors (GCM 7 March 1874).

Following these changes the Hall trade believed that its prices were more competitive. In 1878 the deputy treasurer, Willington Clark, spoke about the importance of removing "the widespread and false impression that charges for medicines at the Hall are much in excess of elsewhere".[38] He claimed that a comparison of the prices of nearly 600 articles from the Hall with an unspecified price list, published by "a popular advertising company", showed "that in charges alone made to the three sections of customers addressed, the aggregate was much above that of the Hall".[39] However, if the heavy discounts offered by the other firm were taken into account, the Hall charges were now a little in excess, although the other firm gave a shorter period of credit. With these qualifications, Clark's initial claim was somewhat diminished and perhaps the most favourable comment that can be made is that the Society's prices were not as expensive as was generally thought. Meanwhile, despite Clark's observations, the costly reputation of Hall drugs remained.

Further problems arose from the conflicting interests of the Society's tripartite functions. The Hall's trading activities during the United Stock had always been constrained by the Society's concerns about its reputation as a licensing corporation. Although by the 1870s the Society's decreased influence in this sphere[40] had reduced the scrutiny given to its actions, the sentiment that the pharmaceutical trade was an unsuitable activity for a licensing body remained. Meanwhile other restrictions caused by the Society's institutional complexity were becoming increasingly influential.

As explained in chapter five, to ensure that it was not tainted by commercialism the Society refrained from advertising and relied instead on its reputation for quality to sell drugs. Whilst this did not appear too great a disadvantage in 1823, by the 1870s

[38] GCP 7 December 1878.

[39] GCP 7 December 1878.

[40] See chapter seven.

pharmaceutical firms were increasingly using advertising to generate business. By the final years of the United Stock, virtually all of the Hall's main competitors advertised in the trade journal *The Chemist and Druggist*. Advertisements generally focussed on a specific product, but this coverage also drew wider attention to the firm.[41] Additionally, from the content of *The Chemist and Druggist,* it appears that frequent advertisers received further coverage in the journal, with publicity on new products or premises often accompanied by an article on the developments.[42] Pharmaceutical firms also advertised in *The Lancet,* with the emphasis again on promoting a specific product.[43] Given their medical audience, these advertisements tended to be more factual, including references from medical journals.[44] The advertisements also demonstrated the marketing benefits of selling pure, high-quality products to customers. This was recognised by Jesse Boot when he incorporated the Boots Pure Drug Company in 1888, as his firm moved into pharmaceutical manufacturing.

However, the acceptability and possible utility of advertising for the Hall trade was quite different than for other firms. Not only was advertising considered an unsuitable activity for the Society, but also, as it did not develop speciality lines, it had no specific products to publicise. Meanwhile, as the majority of references to the Society in *The Chemist and*

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[41] For example, T. and H. Smith advertised themselves as manufacturers of salts of morphia and pure chloroform (*Chemist and Druggist*, **21**, 15 January 1879, p. 81 of advertising section).

[42] For example, *The Chemist and Druggist,* **74,** 30 January 1909, contains an extensive supplement advertising the firm Burgoyne, Burbidges and Co. and in the journal an article entitled "Linking Three Centuries: Notes on a Visit to Messrs Burgoyne, Burbidges and Co.'s New Chemical and Pharmaceutical Factories at East Ham", appears (pp. 165-7).

[43]For example, Savory and Moore's peptonic and pancreatic specialities (*The Lancet*, 3 January 1880, trade and miscellaneous adverts section, p. 11).

[44] For example, an advert for Allen and Hanburys' Perfected Cod Liver Oil quoted from the *British Medical Journal, The Lancet, The London Medical Record* and *The Medical Times and Gazette* (*The Lancet,* 3 January 1880, trade and miscellaneous adverts section, p. 15).

Druggist were derogatory[45] and the journal was orientated towards the pharmaceutical trade, the Society would not have wished to advertise there. However advertising in *The Lancet* would have been more suitable, as it would have publicised the Hall trade to a desirable market of medical men from whom purchases were declining.

The Society's reluctance to advertise was not the only impact of its tripartite nature that had increased in significance by the 1870s. Although conflicting interests between the Society's three distinct roles had often arisen, during the 1870s the trade's reduced profits led to further problems. Tensions arose over the rent paid by the United Stock to the Society, an incident that showed how the financial interests of the trade and the Society as a whole could be different. In the 1870s the rent paid by the United Stock to the Society was still based on reasonable terms negotiated in the late-eighteenth century, with the Stock paying £440 8s 6d a year.[46] The majority of this sum was not considered rent, but as money paid to the Society for the "privilege or compensation for the use of its name".[47] When the leases expired at Christmas 1877, the Society wanted to increase the rent, as the greater part of its premises, which had a rateable value of £2,000, was in the possession of the United Stock.[48] However, the increase was unpopular due to the stock's trading difficulties. The GCM offered to pay £600 in rent for the following year, which the Society agreed to, although the Court commented that it is "not what we deem sufficient but such

[45] For example, significant space is devoted in *The Chemist and Druggist* in 1878 to the ongoing legal action between the Society of Apothecaries and certain chemists and druggists, supported by the Chemists' Trade Association, over unqualified practice (*Chemist and Druggist,* **20** (1878), pp. 242, 249, 254 and 259).

[46] GCM 7 September 1878; Clerk's Report re Leases held from the Corporation, 1877, E/7 Loose Papers, Box 6.

[47] CM 21 December 1877.

[48] CM 21 December 1877.

as will prove the desire of the Committee to acknowledge the just desire of the Corporation".[49]

Protecting the interests of the livery and licensing functions seemed especially important when the trade was in difficulties, because the Society corporately was ultimately responsible for any losses incurred (see chapter two). Henry Field had previously drawn attention to how "if every member of the Society was a proprietor of the United Stock, there would be less difficulty on the part of the Court of Assistants".[50] In the 1870s, as the number of members who were United Stock proprietors reduced, these concerns were even more important.

The changes in medical practice that caused proprietors to purchase fewer drugs from the Hall trade have been described in chapter five. However by the 1870s this problem had deteriorated. In 1878 only ninety out of 295 proprietors had accounts with the United Stock.[51] This not only demonstrated how the Society's trading activities had become less relevant to its membership, but it also indicated a change in proprietors' expectations. As few proprietors purchased Hall products they no longer benefited from the discount on drugs that came with holding a share in the United Stock. This meant that their primary motivation for investment was the expectation of receiving an annual dividend, something that placed a different pressure on the United Stock. When business was poor, dividends dropped and as a result discontent surfaced amongst the proprietors. This had occurred in the late 1840s, when a small group of proprietors sought to reform the United Stock and

[49] Quote from CM 19 November 1878; see also GCM 7 September 1878.

[50] Henry Field, "Observations on the relative position of the Corporation and the United Stock", 1835, recorded in Makins' notebook, pp. 136-9, quote from p. 136.

[51] GCM 7 September 1878. The discrepancy in the number of proprietors compared to those in the table on p. 173 is a result of the table's data being derived from the number of proprietors at the end of the year.

remove the influence of the Court of Assistants over the trade.[52] Their demands were dismissed and the dramatic increase in dividends during the Crimean War silenced further criticism. However, once dividends fell again, discontent amongst the proprietors, especially those from the second class increased.

In certain respects the criticisms about dividends seem unfair, as many proprietors prospered from the United Stock. A first class proprietor investing £420 at the beginning of the United Stock had received dividends totalling £3,042 18s by 1878, whilst a second class proprietor had received dividends totalling £434 14s on a sixty pound share.[53] However, recent second class proprietors were dissatisfied. They had not received the same benefits as those who had held first class shares for many years, as had the majority of GCM members. Although turnover stood at over £50,000 for 1873 to 1876, as the trade's running costs had increased, profits remained low. For example, turnover was over £75,000 in both 1867 and 1874, but profits halved from £16,000 in 1867 to £8,000 in 1874 (see Graph C in Appendix D). When the India Office stopped using the Society as its main supplier, profits dropped below £3,000 in 1876, 1877 and 1878.

The diminishing dividends had a major impact on the number of proprietors of the United Stock. In January 1823 all first class and the majority of second class shares in the United Stock were taken up,[54] with seventy-one percent of the Society's members having an interest in the trade. However, as the trade's prosperity declined, new members were less

[52] Their demands included constructing a shop in the West End, for the Livery to elect the Court of Assistants, abolishing the Court's veto over decisions regarding the trade and for greater financial accountability from the GCM (GCP 5 December 1846, 4 December 1847, 2 December 1848, 1 December 1849 and 7 December 1850).

[53] In addition to dividends, money from reductions in capital and property sales was also received, which increased the sum further (Makins' Notebook, rear, unpaginated).

[54] USAB vol. 1.

enthusiastic to subscribe to the United Stock, whilst current proprietors were reluctant to remain. These trends are illustrated in the table below, with withdrawals from the United Stock accelerating when no dividend was paid for the trading year 1879.[55]

Decline in Proprietors and Dividends[56]

Year	Number of 1st Class Proprietors[57]	Number of 2nd Class Proprietors	1st Class Dividend	2nd Class Dividend
1860	112	218	£105	£15
1865	112	213	£70	£10
1870	114	206	£56	£8
1875	117	183	£35	£5
1878	111	171	£21	£3
1880[58]	115	140	N/A	N/A

The number of first class proprietors did not decline in the same way as those of the second class, as senior Society members held first class shares. Many first class proprietors were amongst the more traditional members of the Society. They still regarded the United Stock as providing a public service by supplying high-quality drugs, rather than an opportunity for profit, whilst many were also involved in administering the trade. By the end of the United Stock only sixty-four percent of the second class proprietors' shares were taken, compared to one hundred percent in January 1860. This disinclination to invest in the trade was confirmed by the reduction in the percentage of the Society's members who held

[55] The number of proprietors withdrawing from the United Stock led to the rate of interest paid on shares during the year of withdrawal being reduced from 7.5% to 5% from January 1879 (GCM 2 March 1878, GCP 7 December 1878).

[56] Proprietors' Dividends Books T/6 (1857-1874) and T/7 (1875-1881). Dividends for the trading year were announced at the Court of Assistants in March of the subsequent year.

[57] The number of proprietors given is the number on 31 December for that year. This leads to limitations with the data. As a result of deaths and withdrawals from shares during the year the total number of proprietors in each class decreased slightly. For example, in January 1860 the full quota of first and second class shares, 120 and 220 proprietors, was filled, although by December only 112 and 218 of each class remained.

[58] These are the numbers of proprietors remaining on the dissolution of the United Stock.

shares. This dropped from seventy-one percent in 1823 to sixty-three percent in 1880. Although this decrease is smaller, it is significant because it emphasises how the overlap between the Society's membership and the proprietorship of the trade had reduced.

Conclusion

The reduction in support for the Society's trade from its members was just one of the problems that the Hall trade faced in the 1870s. Subtle changes in government administration, greater customer awareness of the importance of economy and alternatives to using the Society's supply, combined with increased competition in the pharmaceutical marketplace manifested themselves in the loss of the Navy and the India Office business. When as recently as 1867 profits had brought in dividends of over £100 for first class proprietors,[59] the loss of both contracts during the 1870s dealt a significant blow to the United Stock and shook the proprietors' confidence in the trade. Furthermore, inherent problems in the trade's administration were aggravated by operational difficulties and it became increasingly apparent that the posts of chemical operator and treasurer provided inadequate managerial direction. Although various alterations were made, their impact was minimal.

The problems experienced during the 1870s were compounded by the escalation of existing ones. Further difficulties arose from the Society's tripartite nature. The limitations placed on the trade's commercial activities were now especially significant with regard to advertising. Additionally, the financial interests of the Society as a livery company and licensing corporation conflicted with those of the trade. As the Society had placed such importance on its supply to government customers, when its business with the Navy and the India Office was lost, all of these problems increased in significance and the Hall trade

[59] CM 27 March 1868.

was in crisis. Many second class proprietors were increasingly dissatisfied with the actions of the GCM and demanded fundamental changes to the way that the trade was administered.

CHAPTER SEVEN

The Demise of the United Stock

By the end of the 1870s the dramatic drop in United Stock dividends was causing increasing discontent amongst the proprietors. This resulted in an extensive debate on how the Hall trade's profitability could be improved and highlighted the vast differences in opinion between the Court of Assistants and GCM on one hand, and many proprietors, especially those of the second class, on the other. The GCM and the Court were increasingly disillusioned by opposition from the Stock's proprietors, the very people who they considered should be the Hall trade's strongest supporters. This ultimately resulted in the dissolution of the United Stock in 1880. Given the reduction in profits, the state of disrepair of the laboratories and continued unease about a licensing corporation being involved in the drug trade, in many respects it was unexpected that the pharmaceutical trade at Apothecaries' Hall continued for another forty years. The Society's decision to continue trading resulted from the threats to its livery and licensing roles that appeared especially concerning in 1880, its tradition of public service and the possibility of future financial benefits. However, to continue the pharmaceutical trade at the Hall, the Society felt that a major reorganisation was required, which saw the Society corporately take over responsibility for the trade and led to an overhaul of its management.

The Dissolution of the United Stock

The decreasing support for the United Stock amongst the second class proprietors during the 1870s has been discussed in the previous chapter. It appears that when the renewal of the stock's leases arose in 1877, some proprietors began to question whether it was worth the Society continuing to pursue its pharmaceutical trade. In many respects it seems that an

atmosphere of panic set in. This was the opinion of the Clerk, James Upton, who looking back at the events of the late 1870s stated "it was the acceptance of figures without enquiry or criticism which brought such a flourishing concern as the United Stock to an end".[1] Upton's statement hints at unwise and hasty behaviour on the part of certain proprietors. However, attempts were made by the GCM to reverse the fortunes of the United Stock; the problem was that agreement could not be reached on the best course of action.

When dividends for the trading year 1876 dropped to just £21 and £3, five of the "younger"[2] members of the GCM, in addition to the older buying committee, were appointed to consider improving the trade's management. The committee's conclusions were not unexpected, blaming a reduction in the wholesale trade for the drop in profits. The proposals to rectify this decline were limited. A price list was to be sent to individual proprietors and the "drug committees" of hospitals and dispensaries and it was suggested that more chemical and pharmaceutical preparations should be made on the premises,[3] indicating that the expense of the policy to purchase drugs had finally been recognised as unfeasible. Unsurprisingly, given their scope, the measures were inadequate. When even lower dividends were reported for 1877 (£17 10s and £2 10s) the auditors prepared a special report, suggesting measures to increase the Society's trade. The slightly different approach of the auditors to the Hall trade's management was highlighted in chapter two and this was seen in their suggestions, which included opening a retail establishment in the West End, "whereby the general obscurity of the present locality might be obviated".[4] This

[1] D4 Financial Papers, Clerk's Financial Statement, 1897.

[2] The five "younger" members had joined the Society in the 1830s, rather than the 1820s or 1810s and two of the five had not yet reached the Court of Assistants.

[3] GCM 2 June 1877. The latter proposal was reiterated the following year (GCM 2 September 1878).

[4] GCM 2 March 1878.

proposal was rejected as it had been in the 1830s and 1840s, whilst the more traditional suggestions of the Master and treasurer were agreed to.[5]

However, major differences in opinion over the United Stock's future arose between the GCM and the proprietors. In 1878 Meredith Townsend,[6] a second class proprietor, suggested a radical overhaul of the trade's management. In place of the GCM and sub-committees, "a manager and small body of directors would be appointed, with a staff of travellers and assistants, a branch in the West End of London and also in some large mercantile centre etc and that the Society be carried on as an ordinary trading company".[7] Townsend had recognised the necessity of development away from the Hall and the advantage that the Society could have in using its contacts to sell drugs to medical men. However, the GCM's reply was abrupt, stating "that however desirable such alterations may be, in such a case as that of the Society, they would be inexpedient and inadmissible",[8] which demonstrated that it could take decisive action when defending the status quo.

These differing opinions on the trade's future highlight the tensions that had arisen in the Society. Although excluded from the GCM, second class proprietors could express their discontent regarding the trade at the annual meetings of the General Court of Proprietors (GCP). As a result, at the GCP in December 1878 "a desultory conversation ensued with reference to the management of the trade of the United Stock"[9] with both the trade's staff

[5] Although the suggestions were mostly unspecified, they did involve sending another circular to proprietors.

[6] For biographical details see Appendix B.

[7] GCM 1 June 1878.

[8] GCM 1 June 1878.

[9] GCP 7 December 1878.

and the GCM under attack from the proprietors.[10] Various alterations to the trade's management were suggested, with demands for greater financial accountability, an examination of laboratory expenditure and representation for the Society's junior members in the trade's affairs.[11]

The GCM refused to agree to any of the demands, a reflection of its dominance by the Society's elite. It contained more members of the Court of Assistants in 1878 than it had in 1822[12] and was determined to maintain the status quo. When the United Stock was founded, many liverymen had experience of the Hall trade through their positions on the management committees of the Navy and Laboratory Stocks, which led to a wider spectrum of the Society's membership being represented on the GCM. By the 1870s, as general interest in the stock amongst members reduced, the filling of committees was reliant on the "active" members of the Society, that is the Court of Assistants. A path of succession to the GCM linked to seniority was established, so that participation in it became something pursued in retirement, and, combined with a general stagnation in membership, an increasing lethargy spread over the trade's management, all impeding change.

The disputes about how to improve the Hall trade's profitability continued and in March 1879 almost a third of the proprietorship, including both first and second class proprietors, demanded that a Special Court of Proprietors be held to discuss the causes of the reduction

[10] Makins' Autobiography, p. 22. Makins incorrectly dates the event as 1879.

[11] GCP 7 December 1878.

[12] There were 20 members of the Court on the GCM in 1878, compared to only 10 in 1822. However, it is unlikely that this was part of a specific policy by the Court to have greater control over the trade's management.

in dividends.[13] This was refused and instead the GCM responded in its usual manner by setting up yet another committee. However on this occasion the appointment of George Makins, now a member of the GCM, was especially significant as his chemical expertise provided a technical perspective on the trade's difficulties.

However, the committee's findings, although thorough, showed little advance on earlier proposals. They recommended manufacturing more drugs at the Hall, making more astute purchases on the drug market and ensuring greater supervision of the trade. The main change to existing policy came with a suggestion to overhaul the management structure by merging the three existing sub-committees to form a special managing committee.[14] As had been the case in 1871, there were still problems with the laboratory. Alexander Stewart no longer lived at the Hall, so it was suggested that a resident assistant to the chemical operator could be employed to ensure adequate supervision in the department. Meanwhile various operational changes were also proposed.[15] However the committee's most important conclusion was that any fundamental change to the Hall trade would be extremely difficult. The Deed of Co-partnership that created the United Stock in 1822 had fixed the way in which the trade was administered to safeguard the Society's interests.

> It is evidently framed upon the principle of one part acting as a check upon another and moreover the whole is bound up with and dependent on the corporation, as represented by the Master, Wardens and Court of Assistants.[16]

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[13] GCM 1 March 1879.

[14] Special GCM 1 May 1879.

[15] These included investigating the replacement of manual labour with mechanical and maximising efficiency through dispensers assisting in the wholesale department.

[16] Special GCM 1 May 1879.

As there were "great if not insurmountable difficulties"[17] to altering the Deed, the trade's relationship to the Society and its core management structure, which the Deed specified, could not be changed.

Although the report was adopted, the reformers did obtain one amendment: that a committee of five proprietors, who were not on the GCM, would be appointed to confer with an equal number of GCM members on the trade's problems.[18] The formation of this committee was significant as it was the first time that non-management committee members had an opportunity to express their opinions. The committee appointed included Meredith Townsend and other proprietors who had already raised concerns about the United Stock's management.

However, the two diverse groups that formed the committee could not reach any agreement. The younger, non-management committee members prepared a report, which recommended reducing the number of managers and committees; ensuring fair representation for all proprietors; replacing the chemical operator and laboratory superintendent with a general manager; reducing the salary paid to the treasurer; abolishing the post of deputy treasurer; and distributing the balance sheet to proprietors – proposals that the GCM strongly opposed.[19] When the GCM refused to print their report, to ensure that their opinions were heard, the five younger men distributed it independently for consideration at the December GCP.[20] In response, the remaining members of the joint

[17] Special GCM 1 May 1879.

[18] Special GCP 7 June 1879.

[19] For the full-text of the report and the GCM's response see GCM 6 September 1879 or E/7 Loose Papers, Box 6.

[20] E/7 Loose Papers, Box 6, letter October 1879, accompanying report of non-GCM Committee members.

committee[21] printed their own conclusions, describing the other report as "neither prudent nor politic"[22] and emphasising how changes in the committee structure and management were contrary to the Deed of Co-partnership. In their opinion the key to the continuation of the trade was not the major reorganisation of its structure, but the introduction of greater economy and efficiency into management and the mode of business. Although there was nothing fundamentally wrong with these proposals, they were inadequate to reverse the declining fortunes of the Hall trade.

As a result of the heated debate on the trade's future, the GCP held in December 1879 had a much larger attendance than usual, with seventy-eight proprietors present. The GCM elected at the meeting reflected the discontent and the desire for reform. It contained eight new members and only fourteen members of the Court of Assistants. The demands for change had finally made an impact on the GCM, which was demonstrated by the events of 1880. Following the trading deficit of £967 7s 3d in 1879, it was impossible to pay any dividends. Having discussed the Auditors' Report, the March Court of Assistants asked the GCP to determine "whether the trade shall be carried on, under any and what conditions, or the United Stock be dissolved".[23] At Special GCPs held in March and April 1880, this motion was discussed.[24] At the latter, a committee of twelve, consisting of six members of the GCM, primarily the more recent additions such as Makins, and six non-members, including Townsend, were appointed to consider the Stock's fate. At the next Special GCP in May, where ninety-one proprietors were present, the committee's report was adopted[25]

[21] These included the Master and Wardens, Willington Clark, Edward Bradford and George Makins.

[22] E/7 Loose Papers, Box 6, Report, Apothecaries' Hall, 1 November 1879.

[23] CM 16 March 1880.

[24] There were substantial turnouts of proprietors, eighty-one in March and 108 in April (Special GCP 19 March, 2 April 1880).

[25] It appears that this report no longer survives.

and as a result, a proposal on whether to dissolve the United Stock was unanimously passed.[26] A postal ballot of all of the proprietors was held to confirm this with only three out of the one hundred first class and one out of the 101 second class proprietors who replied opposing.[27] The United Stock was dissolved, valuers were called in and part of the proprietor's share was paid back in August 1880.

A Future for the Pharmaceutical Trade at Apothecaries' Hall?

The prospect of an end to the Hall pharmaceutical trade brought mixed responses from those outside of the Society. In 1878 *The Medical Examiner* took great pleasure in reporting the difficulties with the Hall trade, commenting:

> There must be mismanagement somewhere, but I question whether it would not be a good thing for the Society in the end to shut up shop altogether. It might have a great future if it would only get rid of its gallipots, change its name and throw open its membership to every general practitioner.[28]

The medical press was certainly in favour of an end to the Society's trade. *The Lancet* had always opposed the Society being engaged in such activities when it held responsibilities in medical licensing. When reporting, incorrectly, that all trade at the Hall had ceased, *The Lancet* stated "we congratulate the Society on the cessation of a relationship that was decidedly objectionable".[29] However, elsewhere opinion was quite different. Due to his contacts in the pharmaceutical business, George Makins was asked to enquire about a possible purchaser for the Hall trade. He applied to two firms where he was "well-

[26] Special GCP 14 May 1880.

[27] SCA 18 May 1880; CM 11 June 1880.

[28] Quote from the *Medical Examiner* reprinted in the "Medical Gleanings" column of the *Chemist and Druggist,* **20** (1878), p. 358.

[29] *The Lancet,* 14 August 1880, p. 267.

known"[30] and was met with the response that "we must be mad to dispose of so sound and old a business".[31] Moreover, one of the firms was prepared to purchase the Hall's trading concern.

However, when the committee appointed to consider continuing the Hall trade reported back on 24 August 1880, it was "of the opinion that the Trade and business of the Society may and should be carried on according to the charter for the sale of pure drugs, chemicals and pharmaceutical preparations for at least twelve months".[32] The committee proposed a scheme to execute this plan, the most important part of which was that the trade would now be vested directly in the Corporation, under and subject to the approval of the Court of Assistants. This meant that the Society would have complete responsibility for the trade and receive any profits made. In this simplified format it was hoped that the trade would be more viable. However, the trade was not simply transferred to the Society, as the shares had to be repaid to the proprietors. For the assets of the United Stock, the Society paid £21,500, including £11,500 for its freeholds and leaseholds, £7,457 for drugs, chemicals and sundries and £2,600 for plant, fixtures and fittings. It injected a further £4,000 as a working balance and for security in bank stock, making its total investment £25,500.[33] This was a considerable sum for the Society to invest, and was similar to the partnership capital in May and Baker during the 1870s. However, as Judy Slinn has commented, May and Baker's capital of just over £20,000 at this date was considerably less than that of Howards in the 1830s.[34]

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[30] Unfortunately Makins does not identity these firms.

[31] Makins' Autobiography, p. 24.

[32] CM 24 August 1880.

[33] Loose Note in T/3, Minutes of Court of Proprietors and General Committee; D4 Financial Papers, Appendix to George Corfe's Paper on Income and Expenditure, 1883.

[34] Slinn, 1984, p. 20. In 1837 Howards' capital stood at £38,500.

There were various reasons behind the Court's decision to continue the Hall pharmaceutical trade, but only one that the Society freely admitted to, tradition. The Society's role in ensuring the provision of quality drugs had been laid down in its 1617 charter and even though many of its traditional customers were lost by 1880, the Army and the Crown Agents remained, as did the Society's sense of duty to continue its role in public service.

A further incentive was the appeal of pursuing the trade on the Society's own terms, without interference or demands for dividends from proprietors. The final years of the United Stock demonstrated the difficulties of satisfying both the Society and the proprietors and without the involvement of the latter the Society must have believed that administering the trade would become easier. As long as the Society's assumption of control could be seen as a public service resulting from the terms of its charter, rather than a commercial undertaking, it seemed a sensible step to take.

However, as is shown by the comments in *The Medical Examiner* and *The Lancet* quoted above, there was still hostility to the Society's trading activities. This would surely increase if the Society were to be directly responsible for the Hall trade and receive its profits. In increasing its involvement, the Society opened itself up to more direct criticism about its trading activities and had to be increasingly careful about its actions. However, despite the hostile comments in the medical press, the Society was in a different position from 1822. When the United Stock was formed the Society had been under the spotlight due to its administration of the Apothecaries Act, so its medical licensing functions had to be given priority. In 1880 its declining influence in the medical world meant that its

existence as an examining body was under threat, as for certain sectors of the profession the Society ceased to have much purpose.[35]

The Medical Act of 1858 and subsequent formation of the General Medical Council diminished the Society's role in directing medical education. An amendment to the Apothecaries Act in 1874 updated its examination regulations, but fewer candidates were taking its licence.[36] Discussions by the Royal College of Surgeons and the Royal College of Physicians about the formation of a Conjoint Board eventually excluded the Society from what would become the standard qualification,[37] so its position was further endangered. Following evidence given to the Select Committee on the 1858 Medical Act Amendment Bill in 1879, the Society's seat on the General Medical Council was at risk.[38] The threat of losing its authority in medical licensing[39] at the same time as ceasing its

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[35] *The Lancet*, reporting on evidence about the Society given to the Select Committee on the Medical Act (1858) Amendment Bill, commented that "several witnesses, while admitting that the Society had done good in the past, had advocated the view that it was no longer necessary in the economy of things" (*The Lancet,* 14 August 1880, p. 266).

[36] Newman, pp. 224-6; *The Lancet*, 14 August 1880, p. 267.

[37] Newman, pp. 227-41; Zachary Cope, "The Influence of the Royal College of Surgeons upon Medical Practice in Britain", in F.N.L. Poynter (ed.), *The Evolution of Medical Practice in Britain* (London, 1961), pp. 47-55.

[38] Edward Bradford, the Society's representative on the General Medical Council was unable to give evidence to the Select Committee in 1879, but submitted it instead to *The Lancet* in 1880. Whilst an editorial commented that Bradford's evidence refuted some of the adverse statements given to the Select Committee and recognised the Society's past services to medical licensing, it also concluded "we can certainly perceive no adequate reason for the further continuance of the Apothecaries' Society as an examining body, with a seat in the Council" (*The Lancet*, 14 August 1880, pp. 266-7).

[39] The Society's retention of its licensing powers after the Medical Act Amendment Act of 1886 was largely due to the efforts of its Clerk, J.R. Upton. Although his contribution has not been fully appreciated, without his legal expertise it is unlikely that the loophole in the Apothecaries Act, which enabled the Society to

pharmaceutical trade would have ended the main reasons for the Society's existence. Therefore, despite the prospect of facing greater criticism of its trading activities, this was preferable to an end to its medical and pharmaceutical authority.

These were not the only problems that the Society faced in 1880, as its function as a livery company was also under attack. As I.G. Doolittle has highlighted, livery companies fared badly during the nineteenth century with threats to their existence, a reduced interest in the civic life of Guildhall, and in most companies the end of contact with their trade.[40] However, the Society's various activities in the eighteenth and nineteenth centuries lay in sharp contrast to the stagnation of many other livery companies. Yet despite these differences, the Society was still subject to the questioning of the livery companies' existence that was prevalent at the time. Victorian reformers argued that the companies needed to adjust, devoting surplus revenue to good causes, if they were to survive. The threat of interference or abolition in the 1870s prompted a period of "great awakening"[41] with the companies pursuing projects such as the City and Guilds Institute, but there were still demands for reform. As a result, a Royal Commission into the Livery Companies was appointed in 1880. When its findings were published in 1884, they announced the establishment of a commission to radically re-examine company expenditure.[42] Although the Society was not greatly affected by the Commission's findings, the atmosphere of uncertainty and of having to justify a company's existence that was prevalent in 1880 had important implications on the Society's decision to keep trading. It was surely more than a

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include surgery in its licence, would have been found. The numerous letters in the Clerk's Letter Books of the period provide evidence of Upton's efforts.

[40] Doolittle, pp. 89-90.

[41] Roland Champness, quoted in Doolittle, p. 90, taken from F.W. Law, *The Worshipful Company of Spectacle Makers. A History* (London, 1979), p. 50.

[42] Doolittle, pp. 98-102.

coincidence that 1880 was not only the year that the Commission was announced, but also the same year that the Society decided to continue its pharmaceutical trade.

In its return to the Livery Company Commission, the Society stated how one of the objects of its charter was "to buy, sell or make drugs".[43] In combining the activities of its pharmaceutical trade with its medical examining powers, its various scholarships and its botanical lectureship, the Society's deputation to the Commission demonstrated that it had active duties to perform, whilst illustrating how it fulfilled the terms of its charter and the Acts of Parliament regarding it.[44] The Society also emphasised its vital role in securing a supply of unadulterated drugs to the public through the existence of the Hall trade.[45] It claimed "they have (so to speak) fixed the standard of purity in such articles, and 'Apothecaries' Hall' is always referred to by the medical profession as a place where such standard is strictly maintained".[46] Thus continuing its pharmaceutical trade in 1880 helped the Society to emphasise the case for its existence.

The final reason for continuing the Hall trade in 1880 was financial. Although the trade brought in only minimal profit, it could still be a useful additional source of income for the Society. Whilst the property that the Society acquired on purchasing the United Stock could have been rented out, the possible returns from continuing trading were more appealing. Although the financial situation of the Society was not especially insecure, it had inadequate funds to cover its ordinary expenditure. When extraordinary expenditure,

[43] Royal Commission to inquire into the Livery Companies of the City of London, vol. III, Returns of Minor Companies, 1884 (Cmd. 4073 - II), XXXIX Pt 3, p. 3.

[44] Royal Commission to inquire into the Livery Companies of the City of London, vol. 1, Reports and Memoranda of the Commission and Oral Enquiry, 1884 (Cmd. 4073), XXXIX Pt 1 (hereafter cited as LCC vol. 1) p. 349.

[45] LCC vol. 1, p. 349.

[46] LCC, vol. 1, Statement by the Society of Apothecaries, p. 356.

such as the cost of dinners, scholarships and contributions to widows' funds and pensions, was considered as well, there was a deficiency of £800 a year.[47] If this money had not been available, the Society would have been able to survive, but economies would have been necessary. However, reducing the Society's activities at a time when membership was declining was problematic, as it would have been difficult to attract new members if joining brought few advantages. The income from the trade removed these difficulties. When reporting on the Society's finances in 1883, the Senior Warden George Corfe[48] showed how the £800 deficiency had been made up in the previous three years by the income received from the trade.[49]

However, now that it was directly responsible for the trade, the Society could not be seen as amassing the profits for its own gain. Once the deficiency of income over expenditure was made up, a surplus income, of an estimated £1,900 per annum, had to be dealt with. Corfe suggested that this could be used for more widows' pensions and student exhibitions, but eventually a financial subscription scheme for the Society's members was introduced. Members of the Livery, who numbered 150, were invited to subscribe £250 each, with the total amount received used to purchase various stocks. A generous fixed annual rate of seven percent interest was paid on the sums deposited, with this money coming out of the dividends from the stock purchased and from the trade's profits.[50] Thus, although the majority of the Society's members no longer had any involvement in the administration of the trade, they could still benefit financially from it.[51]

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[47] D4 Financial Papers, George Corfe's Paper on Income and Expenditure, 1883.

[48] For biography see Appendix B.

[49] D4 Financial Papers, George Corfe's Paper on Income and Expenditure, 1883.

[50] CM 26 October, 18 December 1883, 24 June 1884.

[51] However, as the profits from the trade diminished, it became increasingly difficult to pay such a high annual dividend. From the beginning of 1903 it was halved (CM 14 October 1902) so payment of the interest

The Reorganisation of 1880-81

To ensure the viability of the Hall trade, the Society believed that an extensive reorganisation was necessary. In his autobiography George Makins wrote of the "sweeping reform" and "proper management"[52] that was necessary. Meanwhile the laboratories were now in a dilapidated state. As the Society manufactured less at the Hall, the plant and apparatus previously used became redundant. Additionally, due to the decline in the Society's licensing responsibilities, the motivation to maintain impressive laboratories for their rhetorical function in promoting the Society's status had diminished.

When George Makins and Robert Davies,[53] the new trade superintendent, inspected the trading premises in 1881 they discovered that the impressive laboratories were long gone. Makins wrote "we found an immense quantity of room compact (sic), and in the working department vicinity, quite unused; a fine range of extensive cellars filled with rubbish, the old furnace rooms,[54] mortar room, magnesia room, all unused".[55] From Makins' description, only the still house and mill house were functional and a large proportion of the other premises, such as warehouses, were now surplus to requirements. Along with the outdated apparatus, "old and unnecessary stores accumulated during and since the Crimean War",[56] almost thirty years previously, had been left untouched. Thus a major clearout of old drugs, packaging and equipment was required.

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was no longer dependent on the trade's profits, but the reduction caused depositors gradually to withdraw their money.

[52] Makins' Autobiography, p. 24.

[53] For biographical references see Appendix A.

[54] This was called the Great Laboratory in 1822.

[55] Makins' Autobiography, p. 25.

[56] MCM 3 January 1881.

Drastic action was needed to remedy these problems and the steps taken broadly fell into three areas: reducing the administrative framework of the trade, introducing new working practices, and appointing a resident manager and superintendent.[57] This established the trade's pattern of business until its closure in 1922. Typically for decision-making at the Society, an Executive Committee of senior members[58] was appointed to decide on the changes required.

Although the Society assumed direct responsibility for the trade, the number of members involved in its administration was drastically reduced. The posts of treasurer and deputy treasurer, along with the numerous committees were all abolished. Instead a managing committee of six members of the Court of Assistants[59] met weekly to direct and advise the running of the trade. All money received was paid into a new Corporation Trade Account, cheques were signed by two members of the Managing Committee and the trade's accountant, and finally yearly accounts were inspected by a professional auditor,[60] rather than by a committee of proprietors. This format of management continued until the trade closed in 1922.

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[57] The post is also referred to as the general superintendent or trade superintendent.

[58] CM 3 August 1880. The Executive Committee consisted of Thomas Byass, Hugh Statham, James Saner, James Parratt and George Corfe. At a meeting of the Committee on 21 September, George Makins also became a member. Reported at SCA 16 November 1880.

[59] The initial Managing Committee had the same composition as the Executive Committee. The Managing Committee always included the Master and Wardens, with "three of the six to retire at the end of the year, including the Master and the other two by ballot, but all three to be eligible for re-election" (CM 21 December 1880). It is also referred to in the Society's records as the Trade or Management Committee.

[60] MCM 24 August 1880.

New working practices were essential if the trade was to be successful. The duplicative nature of the trade's departments was reduced by various reforms. The end of the United Stock made the proprietors' department unnecessary and the "present cumbrous system of stores"[61] was also abolished. Instead goods were sent immediately to the wholesale department, which was situated in the former Great Laboratory, where all orders were made up at "wet" and "dry" counters.[62] A number of long-term employees, such as Thomas Tingle of the retail department and Mr Sellick, the storekeeper, were finally retired. Steps were taken to reduce staff numbers and improve the operation of both the retail and accounting departments. A major clearout of obsolete equipment and out of date drugs also occurred.[63]

A new drug ordering process was also instituted, with the trade superintendent in charge of purchasing drugs and chemicals, although he placed his requirements before the Managing Committee each week.[64] Emphasis was placed on manufacturing as many drugs as possible at the Hall and ensuring that those purchased were obtained at reasonable prices. Various economies were introduced, such as re-using all old bottles.[65] The Society also adopted some business practices of other pharmaceutical firms. A complete price list of the Society's drugs was printed for the first time and sent to all customers, with the exception of those purchasing in bulk,[66] whilst a discount of five percent was given if the quarterly account was paid within a month.[67]

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[61] CM 28 June 1881.

[62] CM 28 June 1881.

[63] MCM 3 January 1881; CM 28 June 1881.

[64] MCM 18, 25 January, 1, 15 February 1881.

[65] MCM 15 February 1881.

[66] MCM 3 January, 22 March 1881. Although a basic price list was sent out in 1877, its distribution was limited. As the Managing Committee studied the format of price lists from Allen and Hanburys, Corbyn and Co. and Gale and Co. in 1881 this suggests that a detailed list had not been prepared before.

However, the Society continued its policy not to advertise, so customers were informed of the changes in a circular. Typically this emphasised the Hall trade's historical tradition and it also explained how all chemicals and pharmaceuticals were tested prior to sale.[68] This indicated how considerations of quality were as important as ever to the Society, something that was confirmed by the input of the Managing Committee.[69] In the first years after the reorganisation, even drugs previously manufactured at the Hall had to be carefully checked, as long periods of storage or contamination with foreign flavours made some products unsaleable.[70]

The most important figure in the reorganisation was the resident manager and superintendent, who replaced the chemical operator. The newly created post was advertised in the *Pharmaceutical Journal* and the *Chemical News*,[71] the first occasion upon which the vacancy was publicised in this way. This was a significant departure from the way that the chemical operators had been selected and indicated how an established link to the Society was no longer a significant factor when appointing the Hall's head chemist. The desirability of obtaining the post was indicated by the fifty-nine candidates who applied. Eight of these, including Fellows of the Chemical Society and the Institute of

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[67] MCM 5 April 1881.

[68] MCM 3 January 1881.

[69] For example, the Managing Committee recommended that dilute hydrocyanic acid should in future be manufactured on the premises, due to problems with the discolouration of purchased supplies (MCM 26 July 1881). Lengthy discussions also arose over whether Emplastrum Belladonna should be made according to the *Pharmacopoeia* (MCM 22 February, 1 March 1881).

[70] MCM 1, 9 March 1881.

[71] Executive Committee Meeting, 21 September 1880, reported at SCA 16 November 1880.

Chemistry, were "worthy of attention".[72] Eventually three candidates were short-listed by the Executive Committee. Interestingly, Alexander Stewart was not even considered.[73] From the actions of the committees involved in the reorganisation it seems clear that they held him partly responsible for the trade's problems and wanted to ensure his employment ceased. Having read the respective testimonials of the short-listed candidates, Robert Higgins Davies, Demonstrator at the Chemical Laboratory of the Pharmaceutical Society, was invited to appear in front of the Executive Committee on 24 October 1880, after which he was chosen as the new trade superintendent.[74]

The Society's requirements for the new post were quite specific. The suitable candidate was to have "good business qualities", "be a thoroughly practical chemist" and "have under his charge and supervision the whole conduct and management of the Trade".[75] These specifications not only highlight the nature of the reforms occurring at the Hall, but also the changing identity of the chemist. The business qualities required by the suitable candidate not only resulted from the Society's recognition that it was lacking in commercial expertise, but also from the need for the new superintendent to make the trade financially viable. Additionally, chemists in industry had an increased managerial role, with responsibilities stretching beyond the practical requirements of manufacturing to

[72] Executive Committee Meeting, 28 September 1880, reported at SCA 16 November 1880. Fifty-six applications were initially received, out of which five were selected, although subsequent applications increased this number to eight (Executive Committee Meetings 5, 12 October 1880).

[73] Although Stewart's resignation is not mentioned in the Society's records until 9 November 1880 (SCA 16 November 1880), in a letter to James Murie, 27 October 1881 (Linnean Society) Stewart states that he resigned in August 1880 and finished at Christmas.

[74] Report of Executive Committee Meetings 12, 17, 24 October 1880, in SCA 16 November 1880.

[75] SCA 24 August 1880.

supervising junior chemists and representing the business.[76] Whilst some of these tasks resulted from the change in the trade's administrative structure and the removal of the post of treasurer, they also reflected a general increase in the level of administration required in business.[77] Although the superintendent was subject to the control of the Managing Committee, the entire trade was under his direction. He had specific responsibilities to supervise the heads of the wholesale and retail departments, in addition to being in charge of the laboratory. This was a contrast to the situation before 1880, when control of the separate departments was vested in their respective heads.

The competent supervision of the trade was especially important to the Society. This had been absent when the last chemical operator was employed and it was hoped that by ensuring that the superintendent resided at the Hall, as was specified in the advertisement for the post,[78] these problems would no longer arise. Finally, the post continued to require considerable chemical expertise. Practical chemistry skills were essential to understand, apply and improve the manufacturing procedures, in addition to testing the quality of the drugs purchased and produced. Extensive pharmaceutical knowledge was also necessary, as the new superintendent would "be required to buy, with the sanction of the Managing Committee, in the best markets whatsoever may be needed" and to "manufacture such articles as shall be manufactured on the Society's premises".[79] This illustrated how the post still covered the chemical operator's functions, even though the incumbent would have wider responsibilities than any of his predecessors.

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[76] This role was anticipated in the recommendation to appoint a laboratory foreman, as the superintendent was often expected to be absent on business (CM 28 June 1881).

[77] Pollard.

[78] Executive Committee Meeting, 21 September 1880, reported at SCA 16 November 1880.

[79] CM 24 August 1880.

Conclusion

Following all of these reforms, the Society hoped that its pharmaceutical trade would become more viable and that profits would return. However, as the Society now had complete control over the Hall trade, it seemed unlikely that its conservative approach to the trade's management would change. Although the 1880 reorganisation showed that the Society could respond to the impact of competition on its trade, in some ways the changes can be seen as a backward step. The Hall trade had gone from a quasi-commercial body to an adjunct to a livery company and licensing corporation. Nevertheless, the 1880 reforms had created a key new post of trade superintendent and its occupants were to be very influential in the course that the Society's trade would take in the next twenty years.

CHAPTER EIGHT

Robert Davies and William Chattaway: Practice as a Professional Chemist, 1881-1904

For around twenty years following the 1880 reorganisation a different atmosphere surrounded the Hall trade. This was a consequence of the activities of Robert Davies and William Chattaway, the two men who successively managed the trade at Apothecaries' Hall from 1881 to 1904. In contrast to the chemical operators, they possessed standardised qualifications, received specialist training and had important managerial responsibilities. Due to the significant level of chemical activity occurring in the Hall laboratories during this period, the focus of this chapter will be on the chemists Davies and Chattaway, rather than on the pharmaceutical trade. Their employment had a major impact on the Hall laboratories, as they were engaged in a wide range of work that frequently went beyond the trade's requirements. Both Davies and Chattaway provided analytical services for customers and were engaged in applied research, whilst Chattaway was active as a chemical consultant. Much of this consultancy work was performed for the trade's customers and was a consequence of the niche market that the Hall trade found for its drug supply after 1880. As more chemists were employed in the Hall laboratories to deal with the additional work, this helped to create a chemical community at Apothecaries' Hall based on collaboration in research. These developments added to the status of the Society both as a pharmaceutical trade and as a licensing corporation and the rejuvenation of the laboratories was in contrast to the dilapidated state of the "Great Laboratory" in 1880.

Davies and Chattaway: Training and Early Careers

Robert Higgins Davies[1] began his new appointment as trade superintendent in January 1881. He possessed both manufacturing and retail experience in the pharmaceutical trade, having been apprenticed to George Edwards, a chemist and druggist in Dartford, and employed by Messrs Hamilton and Long, apothecaries and mineral water manufacturers of Dublin. He had also worked as a demonstrator in the laboratory of the Pharmaceutical Society and as a private assistant to John Attfield,[2] Director and Demonstrator of Chemistry and Pharmacy at the Pharmaceutical Society. Davies exemplified the professional chemists who had evolved by the late nineteenth century. He held specialist qualifications and had followed specific training procedures, unlike the chemical operators whose training was based in apprenticeship. Having studied at the School of the Pharmaceutical Society, Davies passed its examinations, collecting various prizes. He was a member of all of the professional chemical associations developing in response to the perceived need for chemists to work together not only to implement standards of qualification, but also to improve conditions in the profession. Davies became a Fellow of the Chemical Society in 1873, after qualifying; he was accredited from 1878 as a Fellow of the Institute of Chemistry, the self-consciously professional body established in 1877;[3] he was a member of the British Pharmaceutical Conference[4] and examiner to the Pharmaceutical Society; he joined the Society of Chemical Industry when it started in 1881; and he was a member of the Society of Public Analysts (hereafter SPA) from 1887.

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[1] Biographical references for all of the Hall chemists during this period are found in Appendix A.

[2] *JCS*, **101** (1912), pp. 688-91.

[3] Russell et al.

[4] The Conference was founded in 1863, mostly by members of the Pharmaceutical Society, to encourage pharmaceutical research. However, despite close links between the two, the Conference was not officially connected to it until 1922 (Sonnedecker, pp. 110-11; Holloway, 1991, pp. 215-16).

Davies was an active participant in these societies holding posts on Council, publication committees and as an auditor.

William Chattaway's name first appears in the Managing Committee Minutes of 11 April 1893 when due to Davies' serious illness he was employed "to act for the present as a substitute at the rate of £250 per annum".[5] Davies died, aged forty-two, from tuberculosis on 16 November 1893 and on 5 December Chattaway was appointed his successor. Chattaway had a similar educational background to Davies, qualifying through the examinations of the Pharmaceutical Society and participating in the same chemical societies, again illustrating how this career path was typical for a chemist at this time.

Chattaway began his training with Joseph Young, a pharmacist and analyst of Leicester, and then spent some time in Paris. Having passed the examinations of the Pharmaceutical Society in 1885, Chattaway went to Sheffield as senior assistant to Alfred Henry Allen,[6] the city's public analyst, with whom he was associated for seven years. From 1889 Chattaway was based in London, as a partner in a branch laboratory that Allen opened in Leadenhall Street. Through this working relationship Chattaway built up many of the associations that he was to continue during his employment at Apothecaries' Hall. However, the London partnership was unsuccessful for Chattaway and by late 1892 he had his own private laboratory in the City of London. He became a Fellow of the Institute of Chemistry in 1888 and was active in the SPA from around 1886. However, he did not join the Chemical Society until 1895 or the Society for Chemical Industry until 1900. This is similar to the relatively late date at which Davies joined the SPA and suggests that the personal contacts of an individual chemist had a significant impact on the organisations of

[5] MCM 11 April 1893.

[6] Allen was one of the most prominent analytical chemists of the time and a founder member of the SPA (*The Analyst*, **29** (1904) pp. 233-41).

which they were members. For example, having worked for the Pharmaceutical Society,[7] Davies was active in the British Pharmaceutical Conference and published research in the *Pharmaceutical Journal*, whilst Chattaway, through his links with A.H. Allen, was aligned to the SPA. However, membership of the Institute of Chemistry lay outside of these influences due to the professional accreditation that it provided and both Davies and Chattaway became Fellows relatively early in their careers.

Managing the Hall Trade

As discussed in chapter seven, the Society's requirements for the new post of trade superintendent went beyond chemical expertise. Managerial skills were increasingly important for all chemists, with Davies and Chattaway's responsibilities at Apothecaries' Hall falling into three categories covering the employees, customers and chemical processes. The first of these involved supervising all of the trade's employees, with the workmen, assistants and heads of departments all subject to the superintendent's instructions.[8] This was a contrast to the chemical operator whose jurisdiction had been solely within the laboratory. Additionally, the superintendent decided who to employ and participated in negotiations with the staff.[9] The Society was keen to encourage good relations with its employees and the trade superintendent played an important role in this. Under Chattaway an annual outing for the workers[10] was organised and in 1901 he used

[7] Given the fairly antagonistic relationship between the Pharmaceutical Society and the Society of Apothecaries (Holloway, 1991, pp. 165-6), it is interesting that Davies played an active a role in both organisations.

[8] CM 24 August 1880, 28 June 1881.

[9] In 1903 a pension scheme for the employees was proposed, but eventually it was not pursued. Clerk's Letter Book, A.M. Upton to W. Chattaway, 31 January 1903, p. 271; 5 February 1903, p. 280; 10 February 1903, p. 282; 20 February 1903, p. 293; 21 February 1903, p. 295. These exist from 1876 onwards and are hereafter cited as Clerk's Letters.

[10] For example, MCM 15 May 1900, 26 May 1903.

the occasion to propose a new bonus scheme for the employees,[11] something that was typical of the format of the Society's employment negotiations.

A crucial element of the managerial role was cultivating personal contacts with customers. For example, Davies negotiated with the Examiner of Medical Stores when attempting to win back the India Office business,[12] whilst Chattaway frequently visited the Crown Agents' Office regarding orders and developed a close rapport with certain employees.[13] Personal contact was a key aspect of the Society's gentlemanly approach to business, something that was especially significant in its dealings with public service customers. David Sunderland has emphasised the importance of personal and social ties in the Crown Agents' dealings, whilst the network of class and clubs which fostered the links between the Crown Agents and the City[14] also applied to the Society's relationship with the Crown Agents. The similar ethos of the two organisations helped to foster business between them, as both groups had a gentlemanly approach to commerce. The Agents viewed the Society as an organisation not dictated to by profits,[15] whilst the Society undertook drug supply as a public service.

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[11] MCM 2 July 1901.

[12] See p. 161.

[13] During Davies' tenure and up to 1898, Edward Morpeth, the accountant, performed this role (E/7 Loose Papers, Box 4, E. Morpeth, Notes on Trade, 1904, hereafter cited as Morpeth Notes, 1904). On the retirement of Mr J.G. Leslie, a clerk in the Crown Agents office, special thanks was given to Chattaway for his assistance (MCM 12 July 1904).

[14] Sunderland, "Principals and agents", 1999, pp. 291-3; P.J. Cain and A.G. Hopkins, *British Imperialism 1688-2000* (London, 2002), p. 120. See also L.H. Gann and Peter Duigan, *The Rulers of British Africa 1870-1914* (London, 1978), p. 69.

[15] CA Report 1897, pp. 6-7.

The third aspect of Davies and Chattaway's managerial role concerned the chemical processes performed in the Hall laboratories. James Donnelly has described how an analytical chemist "could develop a managerial role within the laboratory, supervising the work of more routine 'chemists', and undertaking some more skilled or demanding tasks themselves",[16] something that seems likely to have occurred at the Hall. Additionally, the trade superintendent was responsible for the accuracy and efficiency of the chemical processes carried out in the laboratories and for maintaining drug quality. Although the exact nature of chemical manufacturing occurring at the Hall during this period is unclear, it appears that the trade was mostly based around making up preparations, wholesaling, and packaging, rather than manufacturing large quantities of chemicals. Consequently the head chemist was not required to supervise complex manufacturing processes which, as will be seen in this chapter, left time for other activities.

However, due to the poor state of the laboratories in 1880, Davies had to advise on the purchase of up to date equipment for both manufacturing and analysis and to recommend improvements to the processes in operation. His purchases included a polariscope and a spectroscope, for use in analysis and quality control, and a "patent universal kneading and mixing machine" for pill making.[17] Pill production was a manufacturing development that the Hall trade could adapt to, as the smaller-scale apparatus was better suited the Hall's location than that required for producing bulk chemicals. The increased demand for coated pills and compressed tablets, led Chattaway to follow the actions of other firms and purchase new pill making machinery for vacuum coating with gelatine in 1900.[18]

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[16] James Donnelly, "Defining the Industrial Chemist in the United Kingdom, 1850-1921", *Journal of Social History,* **29** (1996), pp. 779-96, quote from p. 782.

[17] MCM 24 January 1882, 6, 27 February 1883.

[18] MCM 2, 9, 23 October 1900. For pill manufacturing see Colin Gunn, "A History of Some Pharmaceutical Preparations", in Poynter, 1965, pp. 131-49

The wide-ranging responsibilities of the trade superintendent were reflected in his salary. Both Davies and Chattaway received £400 per annum on appointment, with Davies' salary later rising to £500 and Chattaway's to £600. These sums were supplemented by income from consultancy work. Although the trade superintendent's various responsibilities make comparisons with other chemists difficult, the Hall salaries appear reasonable. This is especially so given the general poor pay for chemists, which was a key factor in the Institute of Chemistry's foundation and subsequent activities.[19] According to the Institute of Chemistry in 1921, industrial chemists could expect an average of £410 per annum, whilst James Donnelly has noted how analytical chemists were usually paid lower salaries.[20]

Chemical Consultants

The provision of chemical services was important in the careers of Brande and Warington and remained so for Davies and Chattaway. It was common for chemists to hold posts in plurality or take on outside work for an additional income to enable them to make a living as a chemist.[21] However, whilst independent practice in consultancy work was common, the interdependence and co-operation of the Society and its chemists was more unusual. It is quite unexpected to find the Society of Apothecaries, a pharmaceutical manufacturer known for its adherence to tradition, providing these services. However, the Society played an important role in the consultancy work occurring at the Hall supplying infrastructure, reputation and contacts, whilst its chemists brought expertise and initiative. Both groups

[19] Russell et al., pp. 209-12.

[20] James Donnelly, "Industrial recruitment of chemistry students from English universities: a revaluation of its early importance", *BJHS,* **24** (1991), pp. 3-20. For Institute of Chemistry Enquiry see Donnelly, 1991, p. 18.

[21] Russell et al., p. 96.

benefited financially and professionally and the Hall's profile as a site of chemical activity was raised. Many of the consulting services arose out of the specific market that the Society supplied, with colonial work especially important, and they also demonstrated how laboratory activity was an integral part of the Hall trade.

The chemical consultancy work carried out by Davies and Chattaway occurred in the Hall analytical laboratory, which was situated on the first floor above the retail shop.[22] Based on a description from 1922, the facilities for analysis had considerably expanded since the United Stock to include a balance room, analytical laboratory (also called the test room), lower test room and water room. The apparatus available to the chemists gradually increased during the period 1880-1922 to include a polarimeter, refractometer, microscope and urine testing equipment, in addition to the glassware, balances and burners.[23] There was also an analytical office for administrative work, which housed a range of pharmaceutical and chemical journals such as *The Chemist and Druggist* and *The Journal of the Society of Chemical Industry.* The development of such extensive facilities indicated the increased importance of analytical work for the Hall pharmaceutical trade and how the focus of chemical practice at the Hall was no longer only the manufacturing laboratories.

The Provision of Analytical Services

Prior to his appointment at the Hall, Davies performed analytical work for private clients and in 1884 the Society decided that it would provide chemical and microscopical analyses for the public in its own name.[24] Half of the fee received was kept by the Society,[25] an

[22] Clerk's Letters, A.B. Watson to F.F. Shelley, 1 June 1922; E/7 Loose Papers, Box 4, Letter Messrs Chestertons to A.B. Watson, 28 April 1922, and Inventory of Analytical Plant and Apparatus.

[23] E/7 Loose Papers, Box 4, Inventory of Analytical Plant and Apparatus.

[24] MCM 29 January 1884.

arrangement that recognised its role as an infrastructure provider, in terms of a laboratory, equipment and reagents. This was a departure from previous practice when Warington had received all of the income from the analytical work he performed in the Hall laboratory. The situation at the Hall was also different from the experience of most consulting chemists in the late nineteenth century. Many practising chemists complained about the academics' unfair advantages when providing consultancy services. Academics already had the infrastructure in which to work and could thus charge lower fees, when independent practitioners had to bear these costs themselves.[26]

Although many of the developments made to the analytical laboratory after 1880 were essential if the Society was to provide a full range of analytical services to its customers, similar laboratory equipment was also required for quality control of Hall drugs. The use of analytical tests had greatly increased since the time of the United Stock. For example, in 1902 2,940 samples passed through the Hall analytical laboratory, with seventy-four percent coming from the works at the Hall.[27]

Public Analyst Work

The remainder of samples tested were for analytical customers[28] and public analyst work, which provided an important income for many practising chemists. The activities of Frederick Accum and Alfred Hill Hassall had highlighted problems with the adulteration of

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[25] Although initially there were exceptions when Davies performed analyses in his capacity as public analyst and for his existing clients (MCM 29 January, 5 February 1884), it appears that during Chattaway's tenure the Society received half of all analytical income, including public analyst work (Morpeth Notes, 1904).

[26] For general information on consultancy see Russell et al. For the consulting work of individual chemists see Watson, for William Ramsay and Colin A. Russell, *Edward Frankland: Chemistry, Controversy and Conspiracy in Victorian England* (Cambridge, 1996).

[27] MCM 30 December 1902. Unfortunately similar data does not exist for other years.

[28] These included the Post Office, J. Lyons and Co and the Willesden Workhouse (T/10, Ledger, 1912-21).

food and drugs.[29] With the increased government use of legal powers and expertise to invoke technical solutions for society's problems,[30] the services of analytical chemists were utilised. The "Act for Preventing Adulteration in Food and Drink" of 1860 provided for the appointment of public analysts, but was ineffectual[31] and it was not until 1899 that local authorities were obliged to appoint them.[32] However, following the increased legislation during the 1870s,[33] the number of public analysts grew and by 1894 there were 237 in England and Wales.[34]

The growth of the role of public analyst was a crucial factor in the emergence of the analytical consultant, due to the additional income it provided.[35] Davies was already public analyst for Hammersmith and Fulham when he was appointed trade superintendent, whilst Chattaway held the posts for both Hammersmith[36] and Colchester. In Chattaway's first year as public analyst for Hammersmith he examined a total of 234 samples in the Hall

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[29] Stieb, pp. 160-76.

[30] Gerrylynn K. Roberts, "'A plea for pure science': the ascendancy of academia in the making of the English Chemist, 1841-1914", in Knight and Kragh, pp. 107-19; MacLeod, 1988.

[31] Russell et al., p. 105.

[32] Jim Phillips and Michael French, "Adulteration and Food Law, 1899-1939", *Twentieth Century British History,* **9** (1998), pp. 350-69. I am also very grateful to Janet Brian for our discussions regarding public analysts.

[33] John Burnett, *Plenty and Want: A Social History of Diet in England from 1815 to the present day* (London, 1979), pp. 257-63; Michael French and Jim Phillips, *Cheated not poisoned? Food Regulation in the United Kingdom, 1875-1938* (Manchester, 2000), pp. 33-8

[34] However, the distribution and activities of public analysts were far from uniform. See W.S. Saunders, *Report of the Sanitary Condition for the City of London,* 1894.

[35] For example, the salary for Hammersmith's public analyst initially stood at £100, plus twenty-five pounds expenses, but by 1904 had risen to £200.

[36] A change in parish structure occurred in 1886, when the parishes of Hammersmith and Fulham were split and thereafter Davies was just public analyst for Hammersmith, being succeeded by Chattaway.

laboratory, of which twenty-eight were adulterated.[37] The majority of the samples were milk and butter products, with the adulteration of these substances a major problem at this time.[38] Consequently milk analysis was frequently undertaken in the Hall laboratory.[39] Until the end of the nineteenth century between 200 and 250 samples were annually analysed by Davies and Chattaway in their capacities as public analyst for Hammersmith. By 1904 the number of samples from Hammersmith had increased to 400, and there were approximately sixty received from Colchester.[40] However, the total number of samples tells us little about the demand for testing. Samples were officially collected by an inspector, but the limitations of this process, combined with motivations based on salary, influenced the number of samples obtained.[41]

Advice for Clients

Under William Chattaway the provision of chemical services at the Hall developed beyond chemical analysis. The adaptability of chemical skills, combined with attempts to boost the Hall trade, led Chattaway to provide advice and practical assistance for a number of customers on subjects as diverse as vaccines, x-rays and chocolate. Chattaway's emphasis

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[37] William Chattaway, *Annual Report of the Public Analyst for the Parish of Hammersmith for the year ending 25th March 1894*, contained in N.C. Collier, *Annual Report of the Medical Officer of Health for the Parish of Hammersmith for the year ending 31 December 1893.*

[38] P.J. Atkins, "Sophistication detected or, the adulteration of the milk supply", *Social History,* **16** (1991), pp. 317-39.

[39] Correspondence with Chattaway's grandson, Mr P.S. Mason, revealed that Chattaway was chief chemist to the Aylesbury Dairy, although it has not been possible to confirm this.

[40] E/7 Loose Papers, Box 4, Evidence of C.G. Moor to Third Meeting of Special Committee, 15 November 1904 (hereafter cited as Moor Evidence, 1904). It has not been possible to locate any public analyst reports made by Chattaway for his Colchester appointment.

[41] For example, there could be either a set number of samples for an inspector to collect or for an analyst to analyse. When H. Cecil Cribb was appointed public analyst for Fulham in 1898, 350 samples a year were to be submitted, rather than the previous 250.

on chemical consultancy appears to have resulted from his experiences prior to working at the Hall, as he had primarily practised independently. Although the Society's consultancy services were not publicised, if someone requested advice or investigation on a chemical, medical or pharmaceutical topic, it was happy to oblige. This occurred especially with important government and public service customers, for whom it appears no charges were levied. In these cases the Society hoped the work undertaken would increase existing business, making the consulting work an additional aspect of the niche market of public service drug supply that was characteristic of the post-1880 Hall trade.

One firm that employed Chattaway as a consultant whilst he was employed at the Hall was Cadbury Brothers. Chattaway performed analyses and visited their works in a consultative capacity,[42] and whilst it is only possible to speculate on the nature of his contribution, it seems likely that he provided advice on the developments to milk chocolate manufacture that Cadburys introduced from 1902.[43] The relationship between the Hall and Cadburys began when Chattaway instructed George Cadbury Junior, the instigator of the firm's scientific developments at the beginning of the twentieth century, in the analytical laboratory at the Hall in 1896, during his studies at University College London.[44] Cadburys was one of the first firms in the British food industry to utilise developments in chemistry for manufacturing purposes and to employ full-time scientific staff[45] with Nathaniel Parr

[42] A cheque was received for £225 from Cadburys "being retaining fees as an analyst for four years" (MCM 19 May 1902). Chattaway also visited the works "for consultation with the firm on an important matter" (MCM 25 November 1902).

[43] Iolo A. Williams, *The Firm of Cadbury 1831-1931* (London, 1931), p. 81.

[44] As occurred with the analysis work, the fee received for Cadbury's tuition was halved between Chattaway and the Society. MCM 6 October 1896; Williams, 1931, p. 73.

[45] Sally M. Horrocks, "Quality Control and Research – Role of Science in the British Food Industry, 1870-1939", in John Burnett and Derek J. Oddy (eds.), *Origins and Development of Food Policies in Europe* (Leicester, 1994), pp. 130-45.

Booth,[46] who had been appointed junior analyst at the Hall in 1898, Cadburys' first chemist in 1901.

In a complete contrast to chocolate, the Society supplied facilities for the manufacture of toothpaste, something that can also be seen as providing a chemical service for a customer. Mr A.G. England devised a secret formula for toothpaste, which included typical ingredients[47] such as areca nut and thymol, but was more complex than usual. Combined with England's strange preoccupation with secrecy this probably necessitated approaching a manufacturer such as the Society. In September 1901, 283 pots of "Asmorof Toothpaste" were produced in the Hall laboratories, but the absence of further references suggests that the venture was unsuccessful.[48]

However, as would be expected from the importance that the Society placed on public service, the bulk of the Hall's consultancy work was undertaken for its government customers. For example, tests were performed on the germicidal value of different disinfectants for the Post Office, with the hope that this would lead to the Society supplying them.[49] Additionally, when a Parliamentary Committee requested information in 1899 about making the standardisation of autotoxins and vaccines compulsory, a committee was set up at the Hall,[50] indicating how governmental approaches for the Society's assistance were still made. This began an interest in the manufacture of vaccines

[46] Booth set up Cadburys' milk condensing factories and took control of the new Australian Factory in 1923 (Williams, 1931, p. 143).

[47] W.E. Court, "Dental Remedies – A Pharmaceutical Historical Account", *Dental Historian,* **18** (1990), pp. 3-18.

[48] E/7 Loose Papers, Box 5, Papers re contract for manufacturing England's patent toothpaste.

[49] Moor Evidence, 1904; MCM 15, 22, 29 November 1904.

[50] MCM 10 October, 21 November 1899.

and serums, something that developed into an area of expertise for the drug department at the Hall.

The Society's reputation as a medical corporation was especially important for this work. Through the influence and connections of some of its senior members, including Dr Shirley Murphy, Medical Officer of Health for London County Council,[51] in October 1900 Chattaway was requested to consider taking over the supply of Haffkine's Plague Prophylactic for Great Britain, Ireland and the Colonies.[52] Plague Prophylactic was especially significant for the colonies, whilst questions regarding colonial medical supply were frequently the subject of consultancy work carried out at the Hall. Chattaway met with Shirley Murphy to obtain information regarding the manufacture and expense of supplying plague serum and when plague broke out in St Helena in February 1901, an order for 3,000 doses was received.[53] Further orders followed and Chattaway went to Paris in April 1901 to visit the Pasteur Institute, in conjunction with the serum work.[54]

The Society was well placed to assist with this type of work due to its tradition of government service and the combination of medical and pharmaceutical expertise that it could provide. It possessed a well-equipped analytical laboratory, whilst both its chemists and medical practitioner members had the necessary research skills. The Society's membership included numerous influential and knowledgeable medical practitioners,

[51] For biography see Appendix B.

[52] It is possible that as Waldemar Haffkine had fallen out of favour with the Indian Medical Service problems with supply had arisen. I.J. Catanach, "Plague and the tensions of Empire, India 1896-1918", in David Arnold (ed.), *Imperial Medicine and Indigenous Societies* (Manchester, 1988), pp. 149-71.

[53] MCM 9 October 1900, 27 February, 6 March 1901.

[54] MCM 27 March, 10, 17 April 1901. For the Institute Pasteur see Jonathan Liebenau and Michael Robson, "L'Institut Pasteur et l'industrie pharmaceutique", in Michel Morange (ed.), *L'Institut Pasteur: contributions à son histoire* (Paris, 1991), pp. 52-61.

whilst the social environment of the livery company provided a pathway for the sharing of ideas between them and the trade. Although laboratory activity in the British pharmaceutical industry is typically only considered in terms of product development, with the model of research activity being the laboratories at Burroughs Wellcome,[55] the consulting activities at the Society indicate another way in which the laboratory could be used within the pharmaceutical firm.

Work for the Crown Agents

One of the strengths of the Hall consultancy work was its expertise on colonial supply. In addition to the comprehensive service of drug and medical supplies that the Crown Agents received, the free consultancy work that the Hall trade provided was a major factor in continuing the trading relationship. Advice was given on chemical and bacteriological questions that lay outside of their ordinary business relations, such as the supply of condensed milk to the emigration service and the position of France and Germany in connection with the chemical trade in Britain.[56] Another part of this extensive service was the supply of scientific equipment such as water sterilizers and petroleum testers,[57] something that developed further in 1901 following an approach to Chattaway about instructing colonial medical officers in the use of Röntgen ray apparatus.

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[55] Liebenau, 1984; Liebenau, 1988; E.M. Tansey and R. Milligan, "The Early History of the Wellcome Research Laboratories, 1894-1914", in J. Liebenau, G. Higby and E. Stroud (eds.), *Pill Peddlers: Essays on the History of the Pharmaceutical Industry* (Wisconsin, 1990), pp. 91-106; Slinn, 1995.

[56] Moor Report, 1904; MCM 1 April, 4 November 1902. However, whether the latter was an example of impressive foresight, given the problems that would result from the United Kingdom's dependence on foreign drugs, is a matter for speculation.

[57] MCM 18 March 1902, 31 March 1903.

Following Wilhelm Konrad Röntgen's discovery of x-rays, use of the technique quickly spread[58] and in 1897 the Röntgen Society was formed in London, with Chattaway an active member. In response to the Crown Agents' request, the Society developed facilities at the Hall to instruct medical practitioners in using Röntgen rays.[59] Although Chattaway's interest was the main determinant in the development of the project, it is interesting that the Society adopted a new role as an independent provider of x-ray education at a time when instruction was typically undertaken in the hospitals where the equipment was situated.[60] However the therapeutic uses of radioactivity were of particular interest to chemists at this time. For example, William Ramsay was researching how radon could be developed for use in cancer treatment.[61]

In providing a specific service to assist the Crown Agents, the Hall trade illustrated the importance it placed on cultivating its colonial market. Although the Society received the examination fees, the x-ray educational facility did benefit the trade, as it was asked to select, supply and later arrange the repair of x-ray apparatus for the colonies.[62] Chattaway certainly thought the exercise was worthwhile, as "whatever credit fell to the Society for their endeavours to assist His Majesty's Colonial Services, must add to the reputation of the Examining Side; as all, or almost all, those who apply for instruction in Radiography are Medical men already holding Government appointments".[63] As the Hall trade's

[58] E.H. Burrows, *Pioneers and Early Years: A History of British Radiology* (Alderney, 1986).

[59] MCM 8, 15 January, 22 February, 6 March 1901.

[60] Burrows, p. 76.

[61] Watson, p. 154.

[62] MCM 8 May 1901, 1 July 1902, 25 October 1904.

[63] MCM 15 October 1901.

activities were usually perceived to detract from the status of the Society as an examining body, it is interesting to see an example of the opposite occurring.[64]

Although much of the Society's consultancy activity focussed on the provision of advice and expertise, its work for the Crown Agents on smallpox vaccines extended into research. The Society had previously supplied vaccines to the colonies, but this business had been lost when the Local Government Board introduced glycerinated calf lymph, a policy which was also adopted in the colonies.[65] Until 1898 arm-to-arm vaccination was officially preferred in England and Wales, but protests at the degrading nature of stational vaccination, combined with the work of Dr Sidney Monckton Copeman, who recognised glycerine's selective bactericidal action, led to the Vaccination Act of 1898 and the introduction of glycerinated calf lymph.[66] Despite this, the use of glycerinated calf lymph was not without problems[67] and complaints about its effectiveness prompted the Crown Agents to consult Chattaway in 1901.[68] It was arranged that the Society would provide vaccine lymph for experiments in the colonies and, if successful, it seemed that all colonial supply would occur through the Society.[69] However, supply was more complex than in the United Kingdom, as some forms of the vaccine survived transportation better than others

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[64] It is unclear whether the x-ray instruction continued after Chattaway's death in 1904. In 1912 the unwanted apparatus was disposed of (CM 10 December 1912, 11 February 1913; MCM 28 January 1913).

[65] MCM 30 July 1901.

[66] Logie Barrow, "In the beginning was the lymph: The hollowing of stational vaccination in England and Wales, 1840-98", in Steve Sturdy (ed.), *Medicine, Health and the Public Sphere in Britain, 1600-2000* (London, 2002), pp. 205-23; For Monckton Copeman see *Obituary Notices of Fellows of the Royal Society,* **6** (1948-9), pp. 37-50.

[67] Barrow, p. 220.

[68] FO 2/817, Africa Vaccine Supply for Protectorates 1901-03, Crown Agents to Under Secretary of State, 4 September 1901, PRO.

[69] MCM 9, 22 October 1901.

and it was in this area that Chattaway carried out his research. Chattaway believed that preserving the lymph on ivory points was the most viable option,[70] as although this technique had fallen into disfavour in the United Kingdom, the vaccine's desiccated nature was more suitable for transport to tropical environments, whilst the low technology method of administration facilitated its use there.

Given the facilities required,[71] lymph production did not occur at the Hall and instead lymph was mostly obtained from Dr Charles Renner, who had opened an establishment for vaccination with calf lymph on Marylebone Road in 1881.[72] Renner established a good reputation in the field,[73] which was an important factor for the Society who wanted only to be associated with the best suppliers. Both Renner and Chattaway carried out experiments on vaccine usage and shared the results. For example, following experiments by Renner on the suitability of ivory points, Chattaway subjected them to temperature tests.[74] Vaccines were then sent to the colonies for trial and the results returned to Apothecaries' Hall. By October 1902 the feedback was so extensive that, on the Crown Agents' request, Chattaway prepared a detailed report. Although due to "the most remarkable disagreements (that) exist between the opinions of the various colonial medical officers on the subject of

[70] MCM 19 November 1901. To form the vaccine, a point or tooth was inserted in the lymph and this was allowed to dry. It was injected as required, with the blister subsequently formed on the individual after injection used to transfer the immunity from person to person. See also Derrick Baxby, "Vaccination techniques; from knives and forks to needles and pins", *Vaccine,* **20** (2002), pp. 2140-9; *Ibid.*, "Smallpox vaccination techniques. 2. Accessories and Aftercare", *Vaccine,* **21** (2003), pp. 1382-90.

[71] F.R. Blaxall, "Glycerinated Calf Lymph", *BMJ*, (1902) part 2, pp. 38-40.

[72] *BMJ*, (1881) part 1, p. 478.

[73] "Report of the Lancet Special Commission on Glycerinated Calf Vaccine Lymphs", *The Lancet,* 28 April 1900, pp. 1227-1236. Samples from Renner's establishment in January 1900 contained the least bacteria out of the thirteen sources examined (p. 1234).

[74] MCM 4 December 1901.

the vaccine supply", it was difficult to draw any conclusions, the report was mostly in favour of using ivory points, as "this form of desiccated vaccine is likely to withstand climatic influence better than any other".[75]

The report was adopted by the Crown Agents bringing considerable credit to the Society, not only from the Agents, but also from the Colonial and Foreign Offices that were consulted.[76] However, ivory points were not universally adopted and instead colonies ordered the vaccines that they found most effective, with eventually liquid glycerinated calf lymph being preferred. Chattaway continued investigating vaccine usage, but after his death in 1904, the consultancy aspect of supplying the Crown Agents diminished. However, the Society supplied vaccines to certain colonies via the Crown Agents until the closure of the trade in 1922.[77]

Although Chattaway's vaccine work probably did encourage further supplies of this nature to be ordered through the Society, the work was not cost effective, as the Agents did not pay for the advice and only a minimal amount was spent on vaccines.[78] It also gave Chattaway an increased workload and the Society extra expense.[79] Some assistance given to the Crown Agents, such as finding candidates to fill dispenser positions,[80] brought no financial benefit and whilst this work fitted with the public service ethos behind the Hall trade, the monopolizing of Chattaway's time in consultancy work could be problematic. As

[75] FO 2/817, Africa Vaccine Supply for Protectorates, 1901-3, Report on the Vaccine Supply by William Chattaway to the Crown Agents, 19 December 1902, pp. 110-13, quotes from p. 110 and p. 112 respectively.

[76] MCM 5 May 1903.

[77] T/23, Letter Book, 1914-22, F. Shelley to Crown Agents, 3 May 1922.

[78] The only complete data for Crown Agent expenditure on vaccines exists from 1917 to 1920 and averages £235 per annum.

[79] The Society had to meet the cost of failed points and those initially sent out for experimental use.

[80] MCM 21 August 1901, 15 December 1903.

a result of Chattaway's other activities, more staff were employed in the analytical laboratory, increasing the trade's running costs (see p. 228). Whilst consultancy work promoted the pursuit of chemistry in the Hall analytical laboratory and fulfilled the Society's public service remit, in the long term it did not improve the trade's viability.

The India Office Drug Factory

However, on one occasion a request for advice from a government department led to the prospect of significant new business for the Hall trade. Although the Society no longer supplied drugs to the India Office, as the Indian market was reliant on imported drugs the Society felt it could develop its trade there.[81] In 1903 the India Office approached the Society about the feasibility and practicalities of setting up a drug factory in Nassik, India. The Office wanted a firm of manufacturing druggists to establish a factory for supplying the army and civil departments with drugs, worth around £60,000 a year, which would have enabled India to be independent in respect of drug supplies in the event of war.[82] The India Office's approach to the Society at a time when demand for its drugs had greatly reduced was important, as it emphasises the Society's continued reputation in pharmaceutical manufacturing and the significance of its tradition of government service, respectability as a medical corporation and non-commercial outlook. Combined with its work for the Crown Agents, it appears that the Society's trading reputation and contacts remained strongest in the Empire, after having been overtaken in the United Kingdom, something that was a probably a consequence of the gentlemanly nature of all of these organisations.[83]

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[81] For example the Society engaged the services of a traveller in India (MCM 17, 24 November 1903). For the Indian drug market see Anil Kumar, *Medicine and the Raj: British Medical Policy in India, 1835-1911* (New Delhi, 1998), pp. 110-20.

[82] E/2/5/2/6, Indian Drug Factory Papers.

[83] Cain and Hopkins, pp. 120-1.

The Society was prepared to run the Indian factory as long as it received reasonable financial security and a fair chance of profit. However, the establishment would be more like a warehouse due to the small number of drugs that could be manufactured profitably in India.[84] Detailed negotiations followed and in the first few months of 1904 terms of agreement were drawn up.[85] Chattaway's role in the negotiations was increasingly important and in May 1904 he reported that the Director General of the India Office Stores Department appeared "so satisfied that he forwarded the same to India for consideration by the government without delay".[86] Unfortunately the drug factory was never built, possibly because Chattaway's sudden death caused circumstances at the Hall to change, whilst it was difficult to find another firm who could deal with the project in the same manner as the Society. If the plan for the factory had gone ahead, not only would it have influenced the development of the pharmaceutical trade in India,[87] but also the additional business could have helped the Society's trade to survive after 1922.

The consulting activities of Davies and especially Chattaway marked a return to greater scientific activity at the Hall, after the unproductive final years of the United Stock. The work was quite unexpected as the Society's reputation as a traditional pharmaceutical

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[84] A Central Indigenous Drug Committee, set up in 1896, had reported that as indigenous drugs only made up 10-15% of drug imports, the possible savings were not significant enough for manufacture to be considered further (Kumar, pp. 114-5).

[85] The Society would lease plant, land and buildings from the Indian government, but have control of all staff appointments. The drugs supplied would be the same standard as those manufactured by the Society in the United Kingdom, with prices based on the Society's wholesale price list, plus the cost of freight to India (E/2/5/2/6, Indian Drug Factory Papers).

[86] MCM 3 May 1904.

[87] In 1939 only 13% of drugs consumed were produced in India and few foreign companies had manufacturing facilities there (Roger Jeffery, *The Politics of Health in India* (Berkeley, 1988), p. 212).

manufacturer, combined with its functions as a livery company and medical corporation, was not associated with chemical consultancy. However, the niche market that the Hall trade had found for its drug supply led to important chemical work being undertaken in its laboratories. Whilst laboratory activity in the British pharmaceutical industry is typically only considered in terms of product development, the Society's consulting activities indicate how laboratory work was an integral part of its pharmaceutical trade.

Research Work

Although the Hall laboratories did not fit the conventional model of research activity in the pharmaceutical industry, where product development was the ultimate goal, both Davies and Chattaway undertook applied research there. This was linked both to their private interests and to the Hall trade. For example, at the British Pharmaceutical Conference in 1885 Davies highlighted the differing opinions on the purity of quinine sulphate and their consequences for the pharmaceutical industry.[88] Using a polariscope, he performed various experiments to ascertain quinine sulphate's purity and to find a standard pure salt. Although his use of the polariscope in this case was challenged,[89] his research assisted the Hall trade with its purchase of quinine sulphate and illustrated how equipment could have both analytical and research applications for the trade. Links to the Society and the personal interests of Chattaway led individuals to apply to work on research in the Hall analytical laboratory. The analytical chemist Cresacre Moor performed experiments on blood in 1902,[90] whilst Dr Harrington Sainsbury, an examiner in materia medica to the Society, also carried out research there.[91] Chattaway's own research was frequently

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[88] R.H. Davies, "Notes on Sulphate of Quinine", *Pharmaceutical Journal*, **16** (1885), pp. 358-61.

[89] Davies, 1885, pp. 360-1, especially the comments of Dr Paul.

[90] MCM 18 November 1902.

[91] MCM 6 November 1900. For biography see C.H. Brown, *Lives of the Fellows of the Royal College of Physicians of London, 1826-1925* (London, 1955), p. 361.

collaborative in nature and he often worked with the junior chemists employed at the Hall.[92]

Chattaway's most important publication was a digest of researches and criticisms of the *1898 Pharmacopoeia*, which he compiled following a request from the Pharmacopoeia Committee of the General Medical Council. The Managing Committee described this as "a mark of considerable honour to the Society",[93] although Chattaway was approached in his private capacity as an author on pharmacy, not through his employment at the Hall. The link with the *Pharmacopoeia* had been broken after Robert Warington's departure and although Davies provided information on the Society's behalf for the 1885 edition,[94] this appears to have been a routine approach made out of courtesy by the Pharmacopoeia Committee. By Chattaway's tenure, the move from approaching the Society about the *Pharmacopoeia* to approaching an individual with specialist knowledge was complete, again reflecting the general decrease in the Society's corporate influence.

This approach for Chattaway's expertise prompted an application to change the title of his post from what he considered the less dignified term of trade superintendent to chief chemist and manager.[95] Chattaway believed that the new title emphasised his chemical role and he regarded this as the most important aspect of his post. The change also illustrated his concerns about how his status in the chemical community was linked to his position at the Hall, with his relationship with the Society being similar to that of the academic and his

[92] For example, William Chattaway and F.M. Wharton, "Note on a convenient apparatus for the chemical and bacteriological examination of the atmosphere", *The Analyst,* **27** (1902), pp. 243-5; William Chattaway, "Note on the Volatility of Aqueous Solutions of Acetic Acid", *The Analyst,* **28** (1903), pp. 29-31. In this paper Chattaway thanks his assistant, Frederick Shelley.

[93] MCM 30 December 1902.

[94] MCM 3 July 1883, 18 March 1884.

[95] MCM 30 December 1902.

institution. Chattaway's work on the digest also cemented Creasacre Moor's link with the Hall laboratory as from the beginning of 1903 he was appointed to assist Chattaway with this work.[96] Chattaway's *Digest of Researches and Criticisms bearing on the revision of the British Pharmacopoeia, 1898,* was published in late 1903.[97] It contained a collection of the numerous suggestions made about the *1898 Pharmacopoeia* and assisted the compilation of the *1914 Pharmacopoeia.*[98] Ernst Stieb has noted Chattaway's work, along with that of other Hall chemists Cresacre Moor, Thomas Pearmain and Martin Priest, as being important in improving the analytical tests available for determining purity.[99] Although the Society corporately was not involved in the debate over drug adulteration, the chemists it employed undertook applied research that led to increased awareness of the significance of analytical standards, with the results of this work contributing to the *1914 Pharmacopoeia.*

An Educational Role for Davies and Chattaway: the Formation of a Chemical Community at Apothecaries' Hall

As previously noted, much of Chattaway's research was collaborative in nature, and through this he encouraged and educated a number of young chemists who worked in the Hall analytical laboratory. Under Chattaway's guidance these chemists improved their practical skills and became part of a growing chemical community at Apothecaries' Hall. The broad chemical training in the different aspects of chemistry and pharmacy practised

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[96] MCM 20 January 1903.

[97] MCM 13 October, 1, 15 December 1903.

[98] Holloway, 1991, p. 245; Stieb, p. 60, p. 272. Other important works for improving chemical tests and the *1914 Pharmacopoeia* are C.G. Moor, *Suggested Standards of Purity for Food and Drugs* (London, 1902) and A.H. Allen, *Commercial Organic Analysis* (London, 1879), see Stieb, p. 78, p. 97.

[99] Stieb, p. 198, p. 201. However, Stieb highlights the common link between these chemists as their involvement in the SPA.

in the Hall laboratory prepared the junior chemists for the variety of careers that they pursued. Whilst some became public analysts and ran consulting practices, others moved into the chemical industry or agriculture, reflecting the mobility and versatility of the chemical career based on core chemical skills.[100]

Although both Davies and Chattaway took on pupils in the Hall laboratory,[101] since the United Stock a change had occurred to the type of practical education offered to young chemists at the Hall. R.B. Pilcher, Secretary and Registrar to the Institute of Chemistry, described how "frequently a practising consultant would take into his laboratory a newly qualified man at a nominal remuneration as a pupil-assistant to give him an opportunity of gaining experience".[102] This was typical of the practice at Apothecaries' Hall whilst Chattaway was manager, as illustrated by the number of chemists employed as juniors in the analytical laboratory (see table on p. 223). They were often preparing for exams at the Institute of Chemistry whilst studying the subject at a technical college, a typical route into the profession of chemistry at this time.[103] For example, William Partridge studied at the Finsbury Technical College from 1899, began working at the Hall as a junior assistant in the analytical laboratory in 1901, and became an Associate of the Institute of Chemistry in the following year.[104]

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[100] Robin Mackie and Gerrylynn K. Roberts, "Career Patterns in the British Chemical Profession during the Twentieth Century", in David Mitch, John Brown and Marco van Leeuwen (eds.), *Origins of the Modern Career* (Aldershot, forthcoming 2004). For details of Hall chemists' future careers see table on p. 223.

[101] MCM 3 November 1891. The identity of Davies' pupil is not given. Chattaway's student was George Cadbury (see p. 209).

[102] R.B. Pilcher, *The Profession of Chemistry* (London, 1927), p. 39.

[103] Russell et al., especially chapter nine.

[104] For information on how the associateship became a test of professional competence see Russell et al., pp. 159-60, 167-70.

Through employment at the Hall, these young chemists obtained hands-on laboratory experience to complete their training. Although this continued the educational tradition of the Hall laboratories and complemented the Society's identity as a pharmaceutical institution, it was very different from the beginning of the nineteenth century. Then practical experience was provided by the apothecary's apprenticeship and service to the Laboratory Stock. By the end of the century a combination of institutional and workplace education, tested by the exams of the Institute of Chemistry, was the standard. Moreover, obtaining a position working in the laboratory was no longer based on an apprenticeship to a prominent member of the Society of Apothecaries, but on the trade manager's decision.

The junior chemists were paid according to their experience. Those just beginning their careers were paid a salary of fifty pounds, whilst those with more experience were paid from sixty-five to eighty-five pounds, rising to around £100 after a relatively short period of service. Thomas Pearmain, who originally assisted Davies at the Hall, was appointed analytical assistant in 1893 on a salary of £100. His post was increasingly important, as he performed the majority of the routine analytical work required by the trade for quality control. Even just before the First World War, R.B. Pilcher considered it favourable for a chemist to obtain an initial appointment at £100 and many were obliged to accept less.[105]

[105] Pilcher, p. 39; Donnelly, 1991, p. 18.

Chemists Employed at Apothecaries' Hall during William Chattaway's Tenure

Name	Education	Position at Hall	Length of Service	Society Membership	Subsequent Career
T. H. Pearmain	Assistant to A.H. Allen	Analytical Asst	1891-1900	SPA	Died 1900
M. Priest	Finsbury Technical College	Asst Analytical Department	1894-97	AIC 1900, FIC 1905, FCS 1895, SPA	Government Mint, Nanking; Analytical Practice; PA
A.J. Bull	Unknown	Analytical Asst Temporary Employment	1897-? 1902	SPA	Pioneer in Colour Photography
F.M. Wharton	Mason College, Birmingham	Jnr Analyst Snr Analyst	1897-8 1901-02	AIC 1896, FIC 1899, SCI	Government Mint, Nanking; National Explosives Co., Hall Street Metal and Rolling Co.
N.P. Booth	Mason College, Birmingham	Jnr Analyst	1898-1901	AIC 1900, FIC 1903, SPA	Cadbury Bros, Chemist
B.R. Coysh	King's College, London	Jnr Asst Analytical Lab	1899-1904	AIC 1901, FIC 1910, SCI	Industrial Chemist, then pursued agriculture
F.F. Shelley	Victoria College of Pharmacy, Australia, Birkbeck Inst. and others	Lab Employee inc Traveller, Snr Analyst, Gen Manager	1900-04 1904-14 1914-22	FIC 1909, SPA, TS	Analytical Practice; Gas Examiner
W. Partridge	Finsbury Technical College	Jnr Asst Analytical Lab	1901-04	AIC 1902, FIC 1905, SPA	Analytical Practice; PA; author of chemical texts
C.G. Moor	Cambridge MA	Analyst	1902, 1903-04	FCS, FIC 1898, SPA, TS	Analytical Practice; PA; author of chemical texts
W. Gladwyn	Unknown, but worked with Moor	Asst Analytical Laboratory	1904	Not on FIC, FCS, SCI lists	Unknown

AIC: Associate of the Institute of Chemistry; FIC: Fellow of the Institute of Chemistry; FCS: Fellow of the Chemical Society
SPA: Society of Public Analysts; SCI: Society of Chemical Industry; TS: Therapeutical Society; PA: Public Analyst

In addition to providing a good start to a career in chemistry, employment at the Hall also encouraged research and fostered co-operation amongst the chemists employed there. An important figure in the chemical community at the Hall was Cresacre Moor, described in his obituary as "a legendary figure among analytical chemists".[106] Even before his employment at the Hall, Moor had collaborated on research in 1894 with Chattaway and Pearmain on the composition of cheese and the Valenta Acetic Acid Test.[107] The research was published in *The Analyst,* which contained the majority of papers written by the Hall chemists at this time and which was produced by the SPA. The SPA was founded in 1874, ostensibly to consider the report of the 1874 Select Committee on the Adulteration of Food Act (1872),[108] but primarily to represent the "practising chemist" in various conflicts of interest with the government chemists at Somerset House, the medical profession and academic chemists, over who should perform public analyst work.[109]

However, collaboration amongst the Hall chemists extended beyond journal articles. Pearmain and Moor were authors of guides for chemists on the analysis of food and drugs and applied bacteriology.[110] Meanwhile Moor's book *Suggested Standards of Purity for Food and Drugs* provides a good example of the co-operation that existed, as Priest, Partridge and William Gladwyn all carried out some of the practical work involved.[111]

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[106] *Journal of the Royal Institute of Chemistry*, June 1954, pp. 334-5.

[107] W. Chattaway, T.H. Pearmain and C.G. Moor, "On the Composition of Cheese", *The Analyst,* **19** (1894), pp. 145-7; *Ibid.*, "Note on the Valenta Acetic Acid Test", *The Analyst*, **19** (1894), pp. 147-50.

[108] Chirnside and Hammence, p. 7.

[109] Russell et al., pp. 106-9.

[110] T.H. Pearmain and C.G. Moor, *Aids to the Analysis of Food and Drugs* (London, 1895); *Ibid., Applied Bacteriology* (London, 1897). Numerous further editions appeared and after Pearmain's early death in 1900, William Partridge co-authored books with Moor.

[111] Moor, 1902, preface.

Although this work cannot definitely be identified as occurring at Apothecaries' Hall,[112] it appears likely that some of it, along with other non-trade related research activity, was performed there. Edward Morpeth, the accountant, complained in 1904 that large quantities of water, electricity, apparatus and chemicals were consumed in the analytical laboratory as "frequently the assistants (and others not employed by the Society) are engaged on this and other private work until very late at night and occasionally on Sundays".[113]

The chemical community at the Hall, although primarily established through work links and collaboration in research, was strengthened by mutual participation in a range of chemical societies (see table on p. 223) which, as seen in the careers of Davies and Chattaway, was an important part of a chemist's professional development. In addition to membership of the Institute of Chemistry, which established a professional qualification, most notably the Hall employees were members of the SPA.[114] Although public analyst work had a prominent place in Hall laboratory activity and many of its chemists had links to A.H. Allen, one of the SPA's founders, the society's activities were not only relevant to public analysts. In 1899 its definition of membership was broadened to include those with

[112] With the exception of Pearmain, who was described as "Senior Analytical Assistant to the Society of Apothecaries" in T.H. Pearmain and C.G. Moor, *Aids to the Analysis of Food and Drugs* (London, 1899), the links of these chemists to Apothecaries' Hall are not mentioned in their publications. For example, Moor generally describes himself as a member of the SPA and lists appointments such as late senior demonstrator at the public health laboratories, King's College. A possible alternative location for research work was Moor's Laboratory at 4 Dane's Inn, The Strand, where he carried on a consulting practice in association with Priest, in the early years of the twentieth century.

[113] Morpeth Notes, 1904. "This" is a reference to public analyst work.

[114] For a detailed record of SPA posts and the papers that appeared in *The Analyst* see Bernard Dyer and C. Ainsworth Mitchell, *The Society of Public Analysts and other Analytical Chemists: some reminiscences of its first years and a review of its activities* (Cambridge, 1932).

a "bona fide interest in analytical chemistry"[115] and it changed its name to the Society of Public Analysts and Other Analytical Chemists in 1907.

Whilst the SPA helped the Hall chemists to forge links with other chemical practitioners, the strong relationship between the Society of Apothecaries and the Therapeutical Society did the same for these chemists and the medical profession. The Therapeutical Society originated from a suggestion by Dr Robert Lee, a member of the Society of Apothecaries, that it was "desirable to form a pharmacological society in connection with the Apothecaries' Company", due to its specimens of drugs and the presence of "gentlemen well acquainted with their properties and uses".[116] Under the direction of the then Master, T.E. Burton Brown, the Therapeutical Society was formed in 1902 with almost forty percent of the initial Fellows members of the Society of Apothecaries. However, the Therapeutical Society was not restricted to medical practitioners and, in addition to Chattaway, who served on its first Council, the trade employees Cresacre Moor and Frederick Shelley were Fellows, along with the Clerk, A.M. Upton.

The Therapeutical Society met to hear papers on various pharmacological topics at Apothecaries' Hall and, as discussed in chapter nine, its most important interaction with the Hall trade involved Walter Dixon and the physiological standardisation of drugs. Pharmacology was an ideal area for the Society to promote both its medical and pharmaceutical interests and when the Therapeutical Society was founded, it was the only such association in existence.[117] Unfortunately for the Society of Apothecaries, its involvement in the Therapeutical Society weakened in 1907, when the latter became one of

[115] Chirnside and Hammence, p. 41.

[116] *Therapeutical Society Transactions*, (1903), p. 11.

[117] The Royal Medical and Chirugical Society had planned a therapeutical society in 1868, but it did not materialise. Penelope Hunting, *The History of the Royal Society of Medicine* (London, 2002), p. 109.

the thirteen sections of the new Royal Society of Medicine.[118] From the autumn of 1908 meetings were held at the Royal Society of Medicine's premises in Hanover Square,[119] whilst the Therapeutical Society's interdisciplinary nature was reduced because only qualified medical practitioners could become Fellows of the Royal Society of Medicine and thus full members of its Therapeutical Section.

The Therapeutical Society was one example of a way in which the Hall chemists' research activities were fostered and, combined with the influence of the SPA and the collaboration in research, a chemical community developed at the Hall. However, this was only possible because of the substantial increase in the number of chemists employed. During the United Stock, chemical expertise was primarily provided by the chemical operator, with practical assistance from the laboratory foreman. In Chattaway's time, whilst the foreman A.J. Pratt supervised manufacturing,[120] there were numerous chemists working in the analytical laboratory. A similar change had occurred at other pharmaceutical firms. At Howards and Sons chemical expertise had been provided by the partners until the first separate laboratory chemists were employed in the 1890s and by 1900 three "bench chemists" performed routine analysis.[121]

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[118] Hunting, 2002, pp. 289-90.

[119] *Pharmaceutical Journal,* **71** (1908), p. 469, notice of meeting occurring at Hanover Square. The 1907-8 session was the last to be held at the Hall (Hunting, 2002, p. 291).

[120] A.J. Pratt had been employed since 1882. Although his career at the Hall had an inauspicious start when he caused an explosion in the laboratory (MCM 27 December 1883), subsequent work as chief of the Hall's fire brigade (MCM 5 June 1903) and on the recovery of spirit from tincture marcs (the waste products remaining following extraction) (MCM 9 February 1904) redeemed him. Pratt's training is unknown and he appears not to have belonged to any chemical societies.

[121] B.F. Howard, *Howards 1847-1947: A Treatise,* 1956, p. 2, Records of Howards and Sons, Redbridge Local Studies and Archives Service (hereafter cited as B.F. Howard, 1956).

A significant increase in the number of employees had even occurred since Davies' tenure as trade superintendent. In the entire trade department in 1893 Davies employed forty-four men at a cost of £4,513 when there was a gross income of £25,264. In 1903 Chattaway employed fifty-three men, costing £5,108 when the income was now £24,814. During his tenure, Davies had one assistant in the analytical laboratory whom he paid for himself,[122] as was particularly common practice in academia,[123] and a boy paid for by the Society. By comparison, in the analytical laboratory in 1904, there was a chief assistant, Cresacre Moor, two junior assistants, William Partridge and William Gladwyn, a boy to act as a clerk to Chattaway, and Frederick Shelley, who gave part of his time to laboratory work. The Hall trade paid the salaries of all of these men, which totalled £490 in 1904. This was greater than the average annual income of £250 from analysis work.[124] Chattaway made no contribution to these costs, although his income was supplemented by the analytical services provided, whilst the additional work he had taken on was the primary reason for employing more chemists.

Further costs to the Society came in the time expended by Chattaway in consultancy work, which distracted him from his responsibilities as manager of the trade. The period of greatest consultancy and experimental activity at the Hall, 1901 to 1904, saw the profits of the Hall trade drop from over two thousand pounds a year to less than a thousand. Although there was a general downturn in business due to the depression following the

[122] Executive Committee Meeting, 24 October 1880, SCA 16 November 1880. Davies' assistant from at least 1885 to 1890 was Thomas Hunter, who later worked as an analyst in Bristol.

[123] For example, Edward Frankland could only employ as many laboratory assistants at Guys Hospital as he could afford (Russell, 1996, p. 204).

[124] E/7 Loose Papers, Box 4, Comparative Table of Employees' Salaries and Profit, 1903 and Report of the Special Committee appointed by the Court held on 14 October 1904 to discuss the question of the appointment of a successor to Mr Chattaway and the desirability or otherwise of a rearrangement of the management of the trade, 1904 (hereafter cited as 1904 Report).

Boer War,[125] it appears that a general neglect of the trade, due to the numerous projects pursued by Chattaway and the other Hall chemists, must have been partly to blame. Whilst the chemical community at Apothecaries' Hall greatly boosted chemical activity in the Hall laboratories, it primarily existed because this activity was directed at areas other than the manufacture of drugs, something that did not improve the trade's financial prospects.

Conclusion

The period 1881-1904 saw the emergence of new roles for the chemist at Apothecaries' Hall. The activities of Davies and Chattaway were typical of the three main types of chemist[126] working at the end of the nineteenth century, out of which the professional chemical career evolved. Firstly, there are elements of the academic chemist who performed consultancy work for government and industry, pursued research and had an institutional affiliation, with its associated responsibilities. Secondly, there are characteristics of practising chemists who performed services for fees and supplemented their incomes by holding a variety of posts. Finally there is an industrial role, carrying out scientific work in the trade's laboratories and supervising junior chemists.

Whilst the increased managerial responsibilities of the Hall chief chemist were expected by the Society when it appointed Davies in 1880, it did not anticipate the increasing importance that consultancy work would have for the Hall laboratories. Advice was provided on a range of chemical, medical and bacteriological subjects, with the Hall's relationship with the Crown Agents leading to a specific emphasis on colonial work. The services were part of symbiotic relationship between the Society and its chemists, where

[125] T.R. Gourvish, "The Standard of Living, 1890-1914", in Alan O'Day (ed.), *The Edwardian Age: Conflict and Stability, 1900-1914* (London, 1979), pp. 13-34.

[126] Russell et al.; Bud and Roberts; Donnelly, 1996. A fourth category of the government chemist can also be added.

both groups contributed resources and benefited financially and professionally. Combined with the activities of Davies and Chattaway in applied research and the chemical community that developed, the period 1881 to 1904 saw a distinctly different atmosphere at the Hall. Despite its differences from other laboratories in the pharmaceutical industry, as the location for significant consulting work and applied research, the Hall analytical laboratory was increasingly important to the Society's trade. Indeed, the fact that a significant level of chemical activity occurred at the Hall, even though it can be seen as an almost obsolete trading entity, suggests that the contribution of the professional chemist and the laboratory to the British pharmaceutical industry should be reassessed.

Although Davies and Chattaway's tenures boosted the status of the Hall laboratories, their various roles and responsibilities could be problematic. As Chattaway was busy with consultancy and applied research, he often overlooked the institutional responsibilities that accompanied his employment. Additionally he did not possess the business acumen that was a necessary skill for the Hall's chief chemist after 1880. His concentration on practical chemistry and pharmacy, rather than the administration of the Hall trade, meant that many fundamental problems were overlooked.

CHAPTER NINE

The Hall Pharmaceutical Trade, 1904-1914

When Chattaway died unexpectedly from appendicitis on 7 October 1904,[1] the Society was provided with an opportunity to reorganise the trade and to rectify the decline in profits. Its subsequent actions resulted in a distinct change of atmosphere in the Hall laboratories, with a major reduction in the analytical and consultancy work performed, whilst the number of chemists employed was dramatically reduced.

Although the Hall trade was struggling financially in 1904, demand still existed for its high-quality drugs and specialist service. After the 1880 reorganisation, the Hall trade found a niche market for its drug supply, with customers such as the Army and Crown Agents prepared to pay a premium for the services that it offered. Although parliamentary and colonial pressure to curb expenditure eventually ended the Society's monopoly with the Crown Agents and purchases from the Army, government supply remained an important part of the Hall trade and the Society even won new institutional business. Most importantly, encouraged by the Society's medical membership and its role as a guarantor of drug quality, the trade introduced a standardisation service, which resulted in its laboratories being licensed for animal testing. However, continued financial problems led to the decade following 1904 being characterised by numerous investigations as the Society attempted to improve the trade's administration. As the crisis grew, in 1914 the Society's approach to the trade's difficulties altered, with the subsequent investigation

[1] However, Chattaway "was never a robust man – instead he had a delicacy of frame associated with keen intellect and refined thought". *Chemist and Druggist*, **65** (1904), p. 654.

providing an insight into how the Society viewed its trading role in the context of continued changes to the pharmaceutical marketplace.

Reorganisation of the Trade following Chattaway's Death

Continuing the Society's typical practice when faced with a problem, a special committee was appointed in 1904 to consider whether William Chattaway should be replaced as manager and the trade reorganised. However, the vacant post at the Hall had already attracted certain attention. Both John R. Johnson, head of the retail department, and Cresacre Moor, the senior analytical assistant, were keen to stress their credentials, whilst the Society received letters from various analytical chemists applying for the post.[2] However, the special committee felt there was nothing to be gained by promoting any of the present staff or appointing an outsider, so the post of manager was abolished. In the committee's opinion, Chattaway "was too much employed in one branch of the business and in outside work of various kinds to be able to promote the interests of the Society by business methods or proper economy".[3] Despite these comments, the committee acknowledged that Chattaway had considered his actions to be in the Society's best interests.

Following this decision, a major restructuring of the laboratory staff took place with the total number of chemists reduced from five to one. Partridge, Moor and Gladwyn were given notice[4] and only Frederick Farey Shelley remained to deal with all the scientific

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[2] E/7 Loose Papers, Box 4. Suggestions offered by J.R. Johnson, Statement from C.G. Moor, 15 November 1904. Letters were received from W.C. White, analyst to Messrs George Curling, Wyman and Co., Hugh Finnemore, Pharmacist to Guys Hospital and Hugh Candy, an analyst at the London Hospital.

[3] 1904 Report, p. 6.

[4] 1904 Report; Clerk's Letters, A.M. Upton to C.G. Moor, W. Partridge and W. Gladwyn, 23 December 1904, pp. 364-9.

aspects of the business and to direct the analytical laboratories. Shelley was initially employed in 1900 to assist with the manufacture of pills, but he also operated the x-ray apparatus and worked as a traveller.[5] The use of travellers in the British pharmaceutical industry was relatively recent and indicated how the Society was now prepared to make use of its contacts with medical men to encourage business.[6]

Shelley's early training was different from the other chemists based at the Hall at the beginning of the twentieth century. He had moved to Australia at the age of fourteen and qualified as a pharmaceutical chemist at the Victorian College of Pharmacy in 1885, although he had wanted to pursue medicine. Shelley held various posts[7] before he began work at the Hall aged thirty-seven, in what was a fairly junior chemical post. Although he studied at the Birkbeck Institute, Finsbury Technical College and Kings College, he did not take the Institute of Chemistry associateship exam, but qualified immediately as a Fellow in 1909, having passed Branch E of the Institute's exam in the chemistry of food, drugs and water.[8] At a time when the Society was trying to cut costs and minimise staff numbers, Shelley was an especially useful employee, as his chemical, pharmaceutical and salesmanship experience enabled him to perform a range of functions for the Hall trade.

[5] MCM 13 May, 21 October 1902.

[6] In the 1880s Burroughs Wellcome was one of the first British firms to introduce the traveller as part of its sales technique, yet Allen and Hanburys did not appoint one until 1911. Roy Church, "Knowledge for Profit: the early history of Burroughs Wellcome", British Society for the History of Pharmacy Foundation Lecture, 2002.

[7] He practised as a dentist in Australia and was a Burroughs Wellcome representative in South Africa (Whittet, 1977, p. 79).

[8] It seems likely that Shelley only took the exams as the Managing Committee had commented in 1908 that it was "regretted that he had not as yet obtained an English qualification" (MCM 14 January 1908).

As a result of the 1904 reorganisation, it was decided that all employees should devote their services to the Hall trade. The Society gave up work related to public analyst appointments, whilst it would only "retain any analytical work that may come in".[9] In addition to the savings made on chemists' salaries, John Johnson was given notice from the retail department, with Arthur Walker, a dispenser and thus cheaper to employ, replacing him. Edward Morpeth became Secretary to the Managing Committee and had increased managerial responsibility. The heads of the departments were given greater autonomy,[10] whilst the Managing Committee's influence increased.[11] However, the administration of the Hall trade was still very different from other firms in the British pharmaceutical industry. Taking Howards as an example, at this firm daily meetings of the whole board, which included general, works, warehouse and office managers were held.[12] This was in contrast to the elderly medics on the Managing Committee and the accountant Edward Morpeth, who together managed the Hall trade.

Customers: The Establishment of a Niche Market

In chapter five, the strengths of the Society's trade in providing a customer's entire medical requirements and dealing with all sizes of orders were highlighted. The supply of quality drugs with a high standard of customer service lay at the heart of the Hall trade and, after the appointments of Davies and Chattaway, this service developed to include the provision of chemical advice on subjects ranging from condensed milk to vaccines. Few pharmaceutical firms would have undertaken business on the same terms that the Society

[9] MCM 30 December 1904.

[10] For example, the foreman A.J. Pratt took manufacturing decisions that were previously made by the head chemist. In 1906 he visited University College and London Hospitals to examine ointment mills prior to purchase (MCM 24 July, 21 August 1906).

[11] MCM 17 January 1905.

[12] B.F. Howard, 1956, p. 14.

did, without additional charges. Supplying bulk drugs packaged in small quantities was time-consuming, whilst much of the consultancy work only brought possible remuneration through the goodwill generated with customers. Although the Society's charges for its drugs remained high, customers such as the Army and the Crown Agents were prepared to pay a premium for this type of service. As a result, after 1880 the Society found a niche market for its drug supply, with the emphasis on drug quality and a specialist service, primarily to public service customers.

The Crown Agents were the trade's main customer after 1880, on average accounting for forty three percent of the annual turnover whilst Davies and Chattaway were employed. Purchases made by the minor public services, an umbrella term in the Society's accounts that included institutions such as the Post Office, HM Board of Works and Customs and Excise, constituted the second largest portion of the trade's income.[13] A minor public services customer such as Trinity House purchased medical supplies for its lighthouses,[14] whilst the Foreign Office placed orders on behalf of its staff overseas.[15] As with the Society's other business relationships, personal contacts were important. There was a strong rapport with Dr Wilson, the Post Office's Chief Medical Officer and, in addition to the consultancy work on disinfectants (see chapter eight), the Post Office asked the Society to find suitable temporary dispensers.[16] The Society's high standard of customer service was seen in its supply and maintenance of medicine chests and equipment for the vessels of the Royal Mail Steam Packet Company, as it sent employees to check medical supplies

[13] T/2, Laboratory Stock Audit Book; T/8, Trade Account Audit Book, 1858-1911.

[14] T/23, Letter Book, 1914-22, no. 13, 18 May 1920. Details of supply to many minor public services customers can only be found in the extensive archives surviving from the trade's final decade.

[15] MCM 30 December 1902.

[16] MCM 11, 23 December 1901.

on board ships.[17] The supply of drugs to small hospitals and institutions was also important for the Hall trade and, whilst no major London hospitals purchased drugs from the Hall, various Boards of Guardians, dispensaries and asylums were customers.[18]

In addition to the Society's guarantee of quality and its high standard of service, the Society's desire to act as a public servant was an important factor in maintaining its niche market of drug supply. The respectability that accompanied the Society's licensing role was also significant. It aided the trade's dealings with government bodies as the Society was considered a suitable organisation with which to conduct business and seek advice from. This provision of advice mirrored, albeit on a smaller scale, the co-operation between industry, the medical profession and government, which would become more important in Britain during the First World War.[19] A further strength of the Society's trade was its awareness of the importance of emphasising the quality of its drugs and its use of chemical expertise to potential customers, factors that had increasingly become central tenets of advertising in the pharmaceutical industry. Thus, although the Society's trade was unusual, it had various strengths that encouraged business amongst its niche market of customers.

Although the customers discussed above were satisfied with the standard of service and goods provided by the Society, the cost of its drugs still continued to cause complaints. Whilst the War Office was pleased with its system of drug purchasing, whereby Savory

[17] T/23, Letter Book, no. 42, 27 August 1920 and no. 45, 10 September 1920. A charge was made for the visit.

[18] T/10, Ledger, 1912-21.

[19] Roy MacLeod and Kay MacLeod, "The Social Relations of Science and Technology, 1914-39", in Carlo M. Cipolla (ed.), *Fontana Economic History of Europe, vol.5, The Twentieth Century,* part 1 (Hassocks, 1977), pp. 301-63.

and Moore and the Society of Apothecaries undertook supply, packing and distribution,[20] in 1890 the Army's greater expenditure on drugs compared to the Navy[21] was questioned in parliament. Robert Hanbury, MP for Preston and a "vigilant and unsparing critic of the estimates",[22] asked why the Director of Contracts had not adopted the competitive system used by the Navy and had ignored the Auditor General's recommendation to investigate whether medical stores could be obtained more economically through public tender.[23] The matter was placed before the Public Accounts Committee, which led to the system of drug supply being reconsidered. In 1891 Savory and Moore received a letter stating that the current system of purchasing medical stores was to be discontinued[24] and it seems likely that similar correspondence caused the Society's Managing Committee to revise the prices charged to the Army.[25] However, as tendering was open to competition, even after the price revisions, the cost of the Society's drugs proved excessive and in March 1891 its tender was declined.[26]

The Crown Agents faced similar complaints to the Army about the high cost of the Society's drugs compared to other firms. Despite explanations that this resulted from

[20] Reply from W. St John Broderick, *Hansard Parliamentary Debates*, Third Series, vol. 341, 11 February - 4 March 1890, 28 February 1890, column 1497.

[21] Although the Army experienced similar treasury and parliamentary attempts to control expenditure as the Navy, the method of approving War Office estimates encouraged overspending. W.S. Hamer, *The British Army and Military Relations, 1885-1905* (Oxford, 1970), pp. 62-72.

[22] *DNB*. This is supported by the nature of his parliamentary questions in 1890, many of which refer to the Army and Navy Contracts. Anon., "The Story of Savory and Moore", *Supplement to the Chemist and Druggist*, 18 November 1967, pp. 19, 21-2, suggests that the reason for Hanbury's question was a family link to Allen and Hanburys, but I have found no evidence of this.

[23] *Hansard Parliamentary Debates*, 1890, 28 February, column 1497.

[24] "The Story of Savory and Moore", 1967.

[25] MCM 17, 23 February 1891.

[26] MCM 1 April 1891.

different methods of article and freight pricing, lower quality drugs, the absence of a specialist service and contrasting packing policies,[27] many colonies protested that the exclusion of competition prevented them from purchasing cheaper drug supplies. Although initially the Agents continued to favour the Society's exclusive supply,[28] as they faced increasing criticism both at home and in the colonies about the cost and efficiency of their role[29] they became more receptive to complaints. Of particular importance were the protests from the Government of Ceylon in 1905. These demonstrated that a number of other drug companies charged lower prices than the Society.[30] However, the Crown Agents concluded that unless definite assurance could be given on quality, the Secretary of State would not alter current purchasing policy, "which was founded on the special position of the Society of Apothecaries and the uniformly satisfactory character of its supplies".[31]

Despite this decision, the Society's monopoly was weakened when a substantial order, including 30,000 lbs of castor oil, was placed with Messrs Cargill, the Ceylon based import firm, by the Ceylon Government in 1906.[32] Further pressure was placed on the Society's supply following complaints from British Guiana in 1907-8 that it could also purchase

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[27] CO 152/199/15905, Leeward Islands, 1895, vol. 6, Crown Agents to Under Secretary of State Colonial Office, 6 September 1895.

[28] For example, in 1903 introducing competition was considered for the Straits Settlements and Perak, but the matter was resolved in the Society's favour (MCM 5, 9, 30 June 1903).

[29] This culminated in the Colonial Office setting up a committee of enquiry into the organisation of the Crown Agents' Office in 1908 (Sunderland, 1996, chapter seven).

[30] CO 54/696/41765, Ceylon Correspondence, 1905, vol. 4, Colonial Secretary, Ceylon, to Crown Agents, 5 September 1905. The firms listed were the Colombo Apothecaries' Company, Messrs Cargill, Dakin Brothers of London, Evans Sons, Lescher and Webb and Messrs Ferris and Co. of Bristol.

[31] CO 54/696/41765, Crown Agents to Colonial Secretary, 22 November 1905.

[32] CO 323/553/40707, General Correspondence, 1909, vol. 4, Messrs Cargill to Crown Agents, 9 December 1909.

cheaper drugs,[33] whilst *The Chemist and Druggist* took up the story of the Ceylonese dissatisfaction with drug prices.[34]

In July 1908 the Crown Agents stated that it was reconsidering purchasing virtually all of its drugs from the Society. The following reasons were given: improvements in preparing and grading drugs; increased knowledge of specialist local requirements due to greater trade with the colonies; improvements in drug manufacture and finally reduced production costs. However, the recommendations of the 1908 parliamentary enquiry into the Crown Agents were also important, as this introduced a general policy of greater competition in the purchase of supplies.[35] However, in the case of drugs, to ensure that quality was maintained, only selected firms were allowed to tender, whilst samples were examined. The new method of purchasing was tried first in Ceylon and as a result the Society received a form for competitive tendering from the Crown Agents for the first time.[36]

The Society's inability to win tenders when faced with competition, due to its high prices, was illustrated when the Crown Agents "regretfully" declined the tender.[37] The Ceylon trial paved the way for future purchasing policy, as in 1909 the system of limited competition was extended to other colonies.[38] In a circular to the colonial governments in

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[33] CO 111/558/15683, British Guiana Correspondence, 1907, vol. 14, Drugs for Colonial Governments, 30 April 1907; CO 111/564/11749, British Guiana Correspondence, 1908, Crown Agents to Under Secretary of State, Colonial Office, 1 April 1908.

[34] *Chemist and Druggist,* **72** (1908), p. 834.

[35] Report of the Committee of Enquiry into the Organisation of the Crown Agents' Office, 1909 (Cd. 4473), XVI; Sunderland, 1996, p. 303.

[36] CO 323/538/28422, General Correspondence, 1908, vol. 2, Crown Agents to Colonial Office, 31 July 1908; MCM 15 December 1908.

[37] MCM 29 December 1908.

[38] CO 323/553/40707, Circular addressed to Colonial Governments as to extension of competitive scheme.

1909, whilst the fine quality of the Society's drugs was confirmed, the Agents questioned whether quality had been obtained at the expense of economy.[39] The effect on the Society's trade was immediate. Whilst gross income from the Crown Agents had exceeded £17,000 in both 1907 and 1908, it dropped dramatically. By 1913 it stood at just under £4,000, although the Crown Agents remained customers until the trade's closure in 1922.

Although colonial and parliamentary concern about expenditure on drugs ended the Society's supply to the Army and reduced purchases from the Crown Agents, there remained demand for the Society's high-quality service and products. This was illustrated when the Society gained the contract to supply the Metropolitan Asylums Board in 1908. The Board had been founded in 1867, to provide institutional care for those suffering from infectious diseases or psychiatric problems or requiring convalescence.[40] Obtaining new business was quite unexpected as the Hall usually relied on existing custom. This was because competition in the pharmaceutical marketplace had intensified beyond the introduction of competitive tendering. Institutions entered into shorter contracts and this led to a high turnover of suppliers as firms discounted heavily to obtain business.

In 1908, following problems with the quality of drugs supplied,[41] the Metropolitan Asylums Board terminated its contract with Corbyn, Stacey and Co.[42] As the Board wanted to secure an annual contract with "one firm or corporation of the highest standing as

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[39] CO 323/553/40707, Circular.

[40] Gwendoline M. Ayers, *England's First State Hospitals and the Metropolitan Asylums Board, 1867-1930* (London, 1971).

[41] The zinc ointment and olive oil were especially criticised, whilst fifteen of the twenty-seven drug samples analysed proved unsatisfactory. Hospital Committee Minutes, MAB 813, vol. 9, 29 October 1908. The records of the Metropolitan Asylums Board are located at the London Metropolitan Archives.

[42] Contract Committee Minutes, MAB 644, vol. 27, 11 November 1908.

purveyors of drugs",[43] it approached the Hall requesting information on prices and discounts. Although the importance of quality was the main reason for the approach, the Society's reputation as a medical corporation and its image as a public servant were also important, whilst there was possibly personal contact between the Society and the Metropolitan Asylums Board.[44] The Society offered its standard discount of 17.5% on its price list, which the Metropolitan Asylums Board accepted,[45] even though this meant deviating from the Board's standard procedure of advertising for tenders. As the Board was "a quasi-independent authority"[46] and financed from the metropolitan poor rates, it was largely free from central control of expenditure, so the expense of Hall drugs was unproblematic.

The Metropolitan Asylums Board continued to award the contract for drug supply to the Society for 1909-11.[47] Expenditure averaged £2,955 per annum during this time, making the Board the Hall trade's second largest customer. However, a new system of inviting a selected number of firms to tender was introduced in 1910.[48] In 1912 the annual contract was awarded to British Drug Houses,[49] which had been formed from the merger of three

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[43] Proceedings of Managers, MAB 56, vol. 42, 21 November 1908.

[44] It is possible that Shirley Murphy (see Appendix B) who had been employed by the Metropolitan Asylums Board as an assistant medical officer and later served on the Board, again used his influence in the Society's favour.

[45] MCM 17 November 1908; Proceedings of Managers, MAB 56, vol. 42, 5 December 1908.

[46] Ayers, p. 154.

[47] Proceedings of Managers, MAB 57, vol. 43, 23 October 1909; MAB 58, vol. 44, 5 November 1910; MAB 59, vol. 45, 4 January 1911.

[48] Proceedings of Managers, MAB 58, vol. 44, 5 November 1910.

[49] Proceedings of Managers, MAB 60, vol. 46, 9 March 1912; Contract Committee Minutes, MAB 648, vol. 31, 28 February 1912; MCM 11 April 1912. For BDH see G.D. Hopkinson, "An Establishment Unique", *Pharmaceutical Historian*, 13 no. 1 (1983), pp. 8-12.

pharmaceutical firms in 1909. No reason for the change in the Board's supplier was given, but it had been dissatisfied with certain products supplied by the Society[50] and had felt that the size of its order warranted further discounts.[51] However, having changed suppliers, the Board found that it lost a major benefit of purchasing from the Society. British Drug Houses stated that the Board's requests for large deliveries of drugs to be supplied in small packages would lead to extra charges,[52] something that the Society had undertaken at no extra cost. After 1912 the Hall trade remained one of the Board's five approved suppliers,[53] something that illustrated the Society's continued high standing in pharmaceutical supply.

The Physiological Testing of Drugs

The Society's reputation for drug quality, whilst based on its history of drug supply and respectability as a medical corporation, still had to be maintained. This meant that the Society had to respond to developments regarding drug standards. In this respect the trade was greatly assisted by the Society's medical nature, as this provided the necessary contacts and suitable sources of advice. The medical context was especially important regarding a service that the Society introduced in 1909. Primarily through the influence of Walter Ernest Dixon,[54] an early Cambridge pharmacologist who was a member of the

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[50] For example, a complaint was made about iron phosphate that was deficient in phosphoric acid (MCM 31 October 1911).

[51] MCM 7 December 1909; Contract Committee Minutes, MAB 646, vol. 29, 19 January 1910.

[52] Contract Committee Minutes, MAB 648, vol. 31, 8 May, 5 June 1912.

[53] Contract Committee Minutes, MAB 650, vol. 33, 25 February, 11 March 1914. The other firms were British Drug Houses, Wright, Layman and Umney, Allen and Hanburys and May and Baker.

[54] *DNB*; *Proceedings of the Royal Society,* Series B, 1932, pp. xxix-xxxi; W.J. O'Connor, *British Physiologists 1885-1914: A Biographical Dictionary* (Manchester, 1991), pp. 52-4. Dixon's relationship with the Society has been overlooked. He was a member of the Court of Examiners from 1915, sat on the Court of Assistants from 1920, gave official evidence on the Society's behalf and was awarded a Gold Medal by the Society for his contribution to the science of therapeutics (CM 9 March 1926).

Therapeutical Society,[55] the Society of Apothecaries was encouraged to undertake its most innovative project since 1880 - the physiological standardisation of drugs. The Society was amongst the first pharmaceutical firms to undertake this work, which would soon become an essential component of drug manufacturing.

Walter Dixon's research demonstrated that for certain drugs chemical standardisation was inadequate and that, to ensure that drugs such as digitalis and strophanthus were safe for human use, it was necessary to calculate the minimum lethal dose by monitoring the effect on animals.[56] To keep up to date with developments in pharmacology and thereby ensure that the Society's reputation as a guarantor of drug quality was upheld, it was important for the Hall trade to undertake such work. Additionally, there was a demand for these standardisation services. When the Society began discussing the subject in 1906, only two pharmaceutical firms[57] held licences to test on animals, Burroughs Wellcome and Brady and Martin of Newcastle.[58] Following the anti-vivisection protests of the 1860s and early 1870s, the Cruelty to Animals Act of 1876 required the licensing of laboratories and scientists for the use of animals in research.[59]

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[55] See pp. 226-7.

[56] W.E. Dixon, "The Bio-chemical standardisation of drugs", *Pharmaceutical Journal,* **75** (1905), pp. 155-7; W.E. Dixon, *A Manual of Pharmacology* (London, 1906), pp. 32-4.

[57] However, Evans Sons, Lescher and Webb had access to a licensed laboratory through its involvement in the Liverpool Institute for Comparative Pathology, founded in 1902. *The Story of Evans Medical, 1809-1959* (Liverpool, 1959).

[58] E.M. Tansey, "The Wellcome Physiological Research Laboratories, 1894-1904: the Home Office, Pharmaceutical Firms and Animal Experiments", *Medical History,* **33** (1989), pp. 1-41; HO144/738/114089, Messrs Brady and Martin, Vivisection: Registration of their premises, 1905, PRO. Their premises were registered solely for the purpose of standardising drugs.

[59] Richard D. French, *Antivivisection and Medical Science in Victorian Society* (Princeton, 1975).

The initial discussions on developing facilities for physiological standardisation at the Hall resulted from a paper read by Dixon on the subject to the Therapeutical Society in 1906 and a subsequent suggestion from the Court of Assistants.[60] Frederick Shelley also played an important role and Dixon offered to let him work in his Cambridge laboratory for a week to acquaint him with the procedure. Shelley hoped that the project would meet "a demand that has arisen for physiologically standardised drugs and at the same time bring the Society's preparations more prominently before medical men", leading the Society to "reap a great advantage".[61] Given the enthusiasm for the project, it may seem strange that registration was only applied for in 1908.[62] However, this was probably a result of the Society's customary slowness when undertaking a new project.

On 28 January 1909 the Hall laboratories were registered under the 1876 Cruelty to Animals Act, although in contrast to the Wellcome Physiological Research Laboratories,[63] the Society's laboratories were only used for drug standardisation. The Society's nature as a medical licensing company meant that the Home Office did not consider it a commercial establishment, like Burroughs Wellcome and Brady and Martin, something that probably aided its application. However, the Society was undertaking the work for trading purposes, as it wanted not only to standardise its own products, but also to perform the service for other firms.[64]

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[60] W. E. Dixon and G.S. Haynes, "The Biochemical Standardisation of drugs", *Therapeutical Society Transactions,* (1906), pp. 39-45; CM 20 March 1906.

[61] MCM 19 November 1906.

[62] MCM 22 September 1908; E/2/5/1/2, Letter from Home Office to Society regarding registration of laboratories.

[63] Tansey, 1989.

[64] MCM 21 August 1906.

Despite the delay in registering, the Society was still ahead of many other pharmaceutical firms. For example, laboratories at May and Baker were not registered until 1916, with the Boots Pure Drug Company registered in 1922 and British Drug Houses in 1924.[65] As a result of the absence of licensed laboratories at many pharmaceutical firms, the Society standardised drugs for them, with Stafford Allen, Allen and Hanburys, Boots and British Drug Houses amongst its customers.[66] The Society also benefited from business referred to it by Dixon, who felt that the testing previously carried out in his Cambridge laboratory had grown to such an extent that it was no longer compatible with the function of a university laboratory.[67] The service provided at Apothecaries' Hall initially included standardising digitalis, squill, strophanthus and cannabis indica, at a charge of one guinea, and ergot, at a charge of two guineas,[68] but it later developed to include pituitary extracts.[69] The Society's enthusiasm for physiological testing extended to promoting it to the medical community. In response to an appeal by the General Medical Council in 1908 for improvements to the *Pharmacopoeia*, the Society prepared a resolution about the importance of physiological standardisation for consideration by the General Medical Council's Pharmacopoeia Committee.[70] However, it was not until the *1932 Pharmacopoeia* that biological methods of assay were included for strophanthus and digitalis.[71]

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[65] Return showing the Number of Experiments on Living Animals during the year 1916, 1917-18 (108), XXXVIII (all returns hereafter abbreviated to Animal Experiments Return). Animal Experiments Return 1922, 1923 (96), XIX; Animal Experiments Return 1924, 1924-5 (154), XXIII.

[66] T/10, Ledger.

[67] CM 14 March 1910.

[68] MCM 14 June 1910.

[69] Clerk's Letters, A.B. Watson to Secretary, Ministry of Health, 2 April 1921, p. 70.

[70] CM 11 February 1908, 16 March 1909.

[71] *The British Pharmacopoeia 1932* (London, 1932), pp. xxiii-xxv.

Physiological drug standardisation was performed at the Hall by Francis Arthur Bainbridge[72] until he was appointed Professor of Physiology at Durham University in Newcastle in 1911. Although William Legge Symes[73] briefly continued the work at the University of London Physiological Laboratories, when his licence to perform experiments at the Hall came through in October 1911 the work returned there.[74] The Society was keen for Shelley to be registered for the standardisation work, but when he applied in 1914, his lack of medical training meant that he was refused,[75] although it seems likely that he assisted both Bainbridge and Symes.

The new physiological testing service probably caused the analytical department's income to rise steadily from 1909.[76] Considering that the work was carried out in the final years of the Hall trade, the venture proved most successful and it is one of the few examples of innovation occurring at the Society. The Society developed a range of standardised products before many other pharmaceutical firms and the collaboration with Dixon and Bainbridge enhanced the Society's standing in the developing science of pharmacology. Most importantly, the Society's image as a supplier of pure, high-quality drugs was upheld through the sale of its own physiologically standardised preparations.

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[72] *DNB; Proceedings of the Royal Society of London Series B,* (1922) pp. xxiv-v; O'Connor, pp. 262-4.

[73] O'Connor, p. 211.

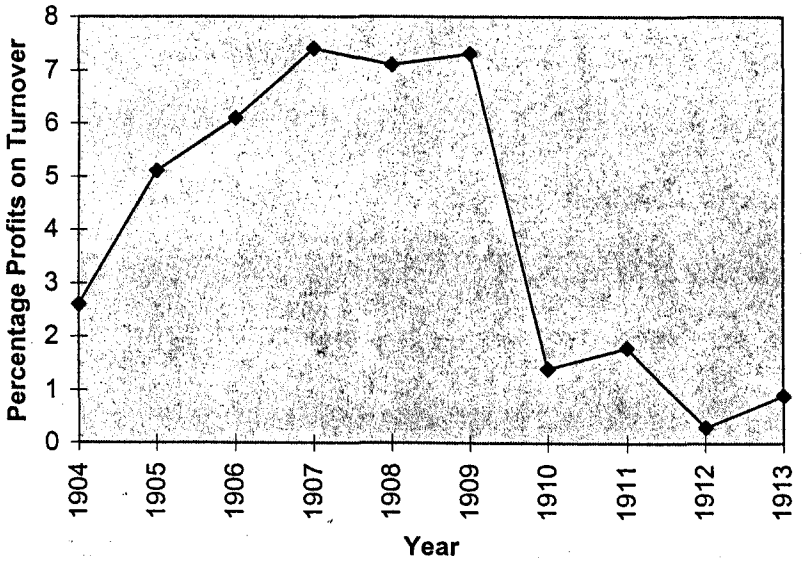
[74] MCM 29 August, 17 October 1911.

[75] MCM 28 March 1911, 15 April 1914; PC 7 April 1914.

[76] It stood at £127 in 1909, £165 in 1910, £208 in 1911, £382 in 1912 and £414 in 1913. However, the financial arrangements for the service are unclear, as although receipts exist for testing carried out by Symes for the Society, the Society paid expenses and dealt with the administration of the service (E/7 Loose Papers, Boxes 1, 2 and 3, Suppliers' Bills and Petty Cash Receipts, 1921-2).

However, the sale of the Hall's physiologically standardised preparations was inadequate to boost the trade's turnover. As the graph below shows, although the reorganisation after Chattaway's death did initially improve the trade's profitability, the trade's financial position became increasingly unstable from 1910. In the previous year various concerns about the trade had been raised. These included the necessity of book-keeping improvements and greater efficiency, whilst the Junior Warden was especially worried about the trade's low profits, which he thought should be around twenty-five percent.[77] Additionally, around twenty-five to thirty pounds of balsamic lozenges were lost from each ninety-pound batch produced. This thieving had occurred since before Chattaway's death, and was a further example of poor management at the Hall. It appears that the Society's benevolent attitude was often abused, even though attempts had been made to tighten up working practices, such as the rules drawn up for the wholesale department and laboratory in 1887.[78]

Percentage Profits on Turnover for the Hall Trade, 1904-13



[77] E/7 Loose Papers, Box 4, Special Meeting of Trade Committee, 12 January 1909.

[78] E/7 Loose Papers, Box 3, Revised Rules for the Wholesale Department, 1887. These included regulations on beer and bread purchases and strict orders not to sleep during the lunch hour in view of the public.

However, the 1909 enquiry was inadequate to prevent a major drop in profits to just £333 in the following year and consequently a special meeting of the Managing Committee was held in February 1911. The committee concluded that due to the peculiar circumstances of the Society's trade "it is practically impossible for them to suggest any means of sensibly increasing the business" and "the only course open to them is to recommend to the Court to take steps to diminish expenses as far as possible, without impairing the efficiency of the establishment".[79] This was the first written acknowledgement by the Society that its trade was unlikely to expand, but it still wished to continue as long as losses could be avoided and its high standards maintained. As a result of the investigation, an unprecedented number of nine redundancies occurred, mostly amongst the workmen, and a pay freeze was implemented.[80] To enable the required reduction in manpower, it was suggested that employees could assist in other departments, whilst an electric motor to drive the millstones[81] could be installed. The Court set up another committee to look into "the whole question of dealing with the Society's premises, except the Hall, and business".[82] Although the Society's premises were briefly advertised, it was decided not to let any part of the buildings[83] and the trade continued as before.

However, the trade's problems went beyond financial difficulties. Poor management contributed to failures in accuracy and reliability, which threatened the Society's reputation

[79] MCM 28 February 1911.

[80] MCM 21 March 1911; CM 14 March 1911. Although 1911 and 1912 saw no salary rises, at the beginning of 1913, wider increases were made (MCM 11 February 1913, entry incorrectly dated as 18 February).

[81] CM 14 March 1911. It was not until 1915 that the mill house was demolished and an electric mill was erected, when the land was required for a street-widening scheme. "An Electrified Millhouse", *The Electrical Times,* 30 September 1915, pp. 259-60.

[82] CM 14 March 1911.

[83] CM 9 May, 11 November 1911, 12 March 1912.

as a supplier of quality drugs. The first complaint to be found on the subject came in 1902, when the India Office was unhappy with drug specimens sent to them.[84] In addition to the complaints from the Metropolitan Asylums Board, a mistake in labelling eye drops in the retail department in 1912 led to an employee being given a month's notice.[85] Meanwhile, in the warehouse, a bottle of potassium bromide was delivered to the City of London Infirmary containing potassium iodide and a few months later, a bottle labelled Spiritus Aetheris Nitrosi was found to smell strongly of ether. Mr Gates, the head of the warehouse, was unable to find who was responsible, so the Managing Committee reprimanded him to prevent such errors in the future.[86] Whilst the absence of effective management contributed to these mistakes, there was also an air of unease amongst the staff.

This unease stemmed from uncertainty about the Hall trade's future, something that was highlighted in an article in *The Chemist and Druggist* in 1913. This reported that "the whole of the premises are now in the hands of house agents and it is probable that abandonment of 'shop' or removal is in contemplation".[87] Although in 1912 twenty-eight percent of employees had served the Society for over twenty-five years,[88] the uncertainty over the trade's future meant that younger employees were less likely to serve the Society for an extended period. This was especially the case in the retail department where there was a high turnover of staff. Additionally, retail pharmacy was changing following the introduction of the National Insurance Act in 1911. In 1912 the Medical Officer of Health for the City of London asked the Society if it wanted to be added to the list of City

[84] MCM 2 December 1902. The Society claimed it was not to blame, whilst the problem was with samples, rather than actual supplies.

[85] MCM 29 October 1912.

[86] MCM 17 December 1912, 11 March 1913.

[87] Anon., "London Wholesalers in 1863 and Now", *Chemist and Druggist,* **83** (1913), p. 413.

[88] List of Employees, c. 1911-12, Trade Papers, AHA.

chemists who were willing to supply medicines and drugs at schedule prices under the National Insurance Act. The Clerk replied in the negative,[89] indicating that the Society still saw itself as providing medicines only to the upper and middle classes. Additionally, only a restricted range of basic medicines was available to patients under the scheme[90] and it is possible that the Society did not want to deal in such supplies. Nevertheless the introduction of the Act was another major social change that passed by the Hall trade.

The problems experienced by the Hall trade were demonstrated when the Society's profit on turnover fell below one percent in 1912 and 1913. This was very different from Allen and Hanburys, where the same figures for these years were 14.1% and 16% respectively.[91] The continuing downturn in business resulted in a major investigation into the Hall trade in 1914. In this year Edward Morpeth, an employee for fifty-two years and who had additional managerial responsibilities following Chattaway's death, retired. Additionally, the new Master, Meredith Townsend,[92] encouraged the Society to examine its trading practices. Townsend had led the demands for change to the United Stock in the late 1870s and his reforming instinct was still important.

The investigation ordered into the Hall trade in the autumn of 1914 was especially significant, as instead of convening yet another committee made up of senior Society members, professional advice from "a competent critic entirely unconnected with the Society's affairs"[93] was sought. This was the first time that the Society had wanted any

[89] MCM 12 October 1912.

[90] Digby, 1999, p. 196.

[91] Calculated from figures in Tweedale, 1990, p. 118.

[92] For biography see Appendix B.

[93] E/7 Loose Papers, Box 5, Special Report of the Trade Committee, 1914 (hereafter cited as Special Report, 1914), p. 1.

outside input into its trading activities, indicating the critical condition of the trade and also the Society's realisation that its measures were inadequate. The investigation was performed by Messrs Evans, Fripp, Deed and Co., (hereafter Messrs Evans) Chartered Accountants of Cannon Street, who, according to the Society, "have very considerable experience in keeping and auditing the accounts of several of the largest wholesale drug houses and are consequently familiar with the most efficient and up to date methods of conducting such business".[94] As a result of Messrs Evans' experience in the field, the firm understood the Society's unusual position in the pharmaceutical trade and was unlikely to make unsuitable suggestions.

Before inviting Messrs Evans to investigate its trade, the Society undertook what was the first true self-assessment of its trading activities. In the Society's opinion, the trade's decline had stemmed from the Society's development "as a professional and examining body, combined with the enormous amount of competition and the introduction of modern methods of manufacture and trading".[95] As has been highlighted in previous chapters, the Society was unable to keep up with the changes occurring in the pharmaceutical industry, admitting that the trade "is carried on therefore in what may be styled a somewhat amateur way, with tradition and habits and customs that come down one may say for nearly 300 years".[96] However, from the Society's viewpoint, upholding these traditions were vital, whilst it was proud that "no thought of economy or labour saving machinery or adaptations of modern methods"[97] was given when manufacturing drugs. Whilst it can be seen why

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[94] Special Report, 1914, p. 1.

[95] E/7 Loose Papers, Box 5, Statement by the Society of Apothecaries (hereafter cited as Statement, 1914), p. 2. This is the statement sent to Messrs Evans requesting their investigation into the trade. Meredith Townsend was probably its author, as the statement was both critical and comprehensive.

[96] Statement, 1914, p. 5.

[97] Statement, 1914, p. 5.

this emphasis on tradition appealed to the Society, by failing to embrace advances in pharmaceutical manufacturing the Society was certain to fall behind its competitors, having higher overheads and employees who were unlikely to maximise efficiency.

The Society's self-assessment also drew attention to the "different and practically opposing characteristics"[98] of its tripartite nature, which made its position "very peculiar and almost unprecedented".[99] For the first time, the Society admitted that its membership structure was not suited to trading purposes. None of the liverymen were under the age of sixty, with some considerably older. Meanwhile as they were professional medical men, some were "not very favourably inclined towards the trade"[100] nor were they experienced in business. Although the Society's licence had declined in importance, this aspect remained its paramount concern as "for years past everything has been done to put the examination side of the Society forward, while the 'trade' side is put in the background".[101] However, these were not the only problems that the trade faced. Unusually for the Society, its criticism of the trade's management was quite sharp, with its operations for the last ten years not "by any means successful".[102] The long-serving heads of the departments had "old fashioned conservative ways" and were "very jealous of interference or criticism", whilst Morpeth "was not a man to push or raise up a decaying business".[103] Consequently the trade's "position is essentially worse today than ten years ago",[104] a rare example of self-criticism by the Society. The Society had finally recognised that without radical change it would be difficult for the trade to survive and left Messrs Evans to answer whether this was possible.

[98] Statement, 1914, p. 2.

[99] Statement, 1914, p. 4.

[100] Statement, 1914, pp. 2-3.

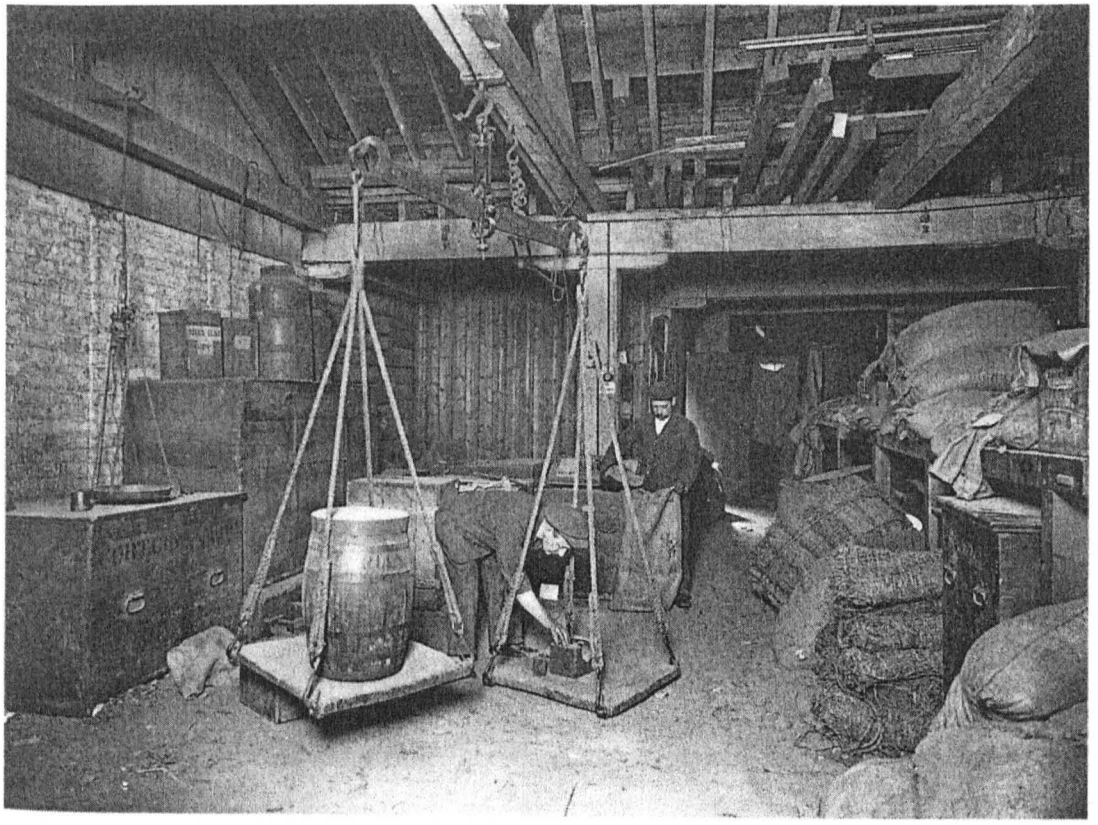
[101] Statement, 1914, p. 3.

[102] Statement, 1914, p. 4.

[103] All quotes from Statement, 1914, p. 4.

[104] Statement, 1914, p. 4.

The Pharmaceutical Trade at Apothecaries' Hall, 1915



This photograph of Hall employees weighing drugs illustrates how little the trade had changed from the previous century. Amongst the drugs stored in the chests adjacent to the wall are cinnamon bark and rhubarb.

In response, Messrs Evans prepared a lengthy and detailed report pointing out six major defects in the Hall trade.[105] These broadly fell into two categories, personnel and operating practices. Primarily, there was no manager to direct the business and employees, whilst expenditure, especially on salaries, was too high for the volume of business carried out. On top of this there were too many trading departments and the buying system was defective as it led to duplication. Poor records were kept in the laboratory and there were extensive deficiencies in book-keeping and pricing.

The Society's failure to adopt standard accounting methods was most striking and Messrs Evans recommended that ten new volumes such as ledgers, cashbooks and profit and loss accounts should be kept.[106] Despite a recommendation in 1867[107] the system of double entry was still not used, with the trade's outdated business methods contributing to losses and unnecessary expenditure. The succession of Morpeths in the accountant's department passed on outdated business practices from one generation to the next, so defects in financial management from the United Stock continued. The report also made recommendations to cut salary costs and improve operating procedures.[108] These included appointing a manager to direct the business; merging the warehouse, stores and packing departments; reducing staff in the pharmacy and office; introducing a typewriter to save time and labour; requiring the manager's consent for overtime and finally placing the manufacturing departments, including the pill room and analytical laboratory, under the control of a factory manager who would be a qualified chemist.

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[105] Special Report, 1914, pp. 1-2; E/7 Loose Papers, Box 5, Evans, Fripp, Deed and Co. Report, October 1914 (hereafter cited as Evans' Report, 1914).

[106] E/7 Loose Papers, Box 5, Letter, Messrs Evans, Fripp, Deed and Co. to A.M. Upton, 15 December 1914.

[107] MCM 2 March 1867. See p. 58.

[108] Special Report, 1914, p. 2; Evans' Report, 1914, p. 2.

In addition to these recommendations, Messrs Evans gave their verdict on the Hall trade's future prospects. Due to the conflicting interests of the Society's three functions, Messrs Evans felt that the Society could not conduct business on the same terms as an ordinary pharmaceutical firm. Instead of advertising, selling proprietary drugs and openly soliciting for business, the Society had to rely solely on the goodwill of its name and on customer recommendations about quality to encourage business. This echoed the reliance on nostalgia, customer loyalty and a shared gentlemanly ethos that were key tenets of the Society's trade. Messrs Evans accurately described the business as being "more a question of sentiment than a commercial proposition",[109] confirming how by this stage the Society was operating the trade to provide a public service rather than to make a profit. Furthermore, it was impossible for the Society to either manufacture, sell or buy drugs at sufficiently low prices to win contracts by tender, which was now the standard method of obtaining business. Messrs Evans concluded that "no business with such conflicting interests is likely to succeed in a trade which is so well catered for by many firms".[110] However, despite this judgement, Messrs Evans believed that the trade could survive as a purveyor of quality pharmaceuticals if the alterations they suggested to reduce expenses and improve management were made.

Messrs Evans, in understanding the key restrictions of the Society's trade, had presented a realistic statement of the Society's prospects and made sensible recommendations for its future. However, the Society's usual reticence, lethargy and paternalistic attitude prevented all of the recommendations being followed. It was felt impractical to carry out all of the changes at once, as this would cause serious hardship to the older employees and instead it was decided to "proceed with caution and step by step".[111] Additionally, the Society could

[109] Evans' Report, 1914, p. 14.

[110] Evans' Report, 1914, p. 14.

[111] Special Report, 1914, p. 3.

not afford to appoint an outsider as manager as recommended and as some knowledge of the peculiarities of the trade was considered important, Frederick Shelley was chosen for the post. Arthur J. Jones,[112] who had worked in the analytical department from 1908-1912, was appointed assistant analyst, with a view to him eventually becoming factory manager, whilst William E. Morpeth was the new accountant. Following assistance from Messrs Evans,[113] the administrative and accounting improvements, such as introducing double entry book-keeping, took place. Overtime was now paid only to workmen and closer supervision of the workforce, finances, orders and purchases occurred, whilst Messrs Evans were appointed auditors.[114]

The position of manager was the key to the reorganisation. Shelley's responsibilities increased even further, as he was in overall charge of the trade, with his appointment marking a return to a managerial role for the chief Hall chemist. Each morning Shelley went through the orders, allocated them to the relevant department and supervised pricing, whilst he also approved all tenders. He checked wages and salaries, monitored stock levels, gave special attention to laboratory records, approved accounts and supervised all bank transactions. Drug buying was under his direct control and wherever possible he purchased drugs through brokers or on the drug market at Mincing Lane, rather than through the more expensive wholesale houses, as previously had occurred. Additionally, to ensure that the Managing Committee was aware of the trade's purchases, sales and financial position,

[112] Jones qualified as an AIC in 1922 and was later employed as Works Manager and Director at Evans Medical Supplies (formerly Evans Sons, Lescher and Webb).

[113] E/7 Loose Papers, Box 5, Letter Messrs Evans to A.M. Upton, 15 December 1914; MCM 8, 15 December 1914.

[114] MCM 8, 15, 22, 29 December 1914, 5, 12, 19 and 24 January, 30 March 1915.

Shelley presented them with a monthly report.[115] Unlike Chattaway, Shelley diligently followed his managerial responsibilities, and his contributions were of immense value to the Society during the trade's final years.

Following the investigation into the trade, the Managing Committee Minutes show increased activity and greater accountability. However, in several key areas the advice of Messrs Evans was not followed. Most importantly the warehouse, stores and packing departments were never merged so the duplication of tasks such as ordering and packing continued,[116] whilst salaries for three heads of department instead of one warehouse manager were required. A similar failure to implement personnel changes occurred in the other departments. Jones never became the Factory Manager[117] and no redundancies were made in either the accounts or retail departments, despite the clerical reorganisation. Messrs Evans had also highlighted how the retail shop was an unnecessary expense, which could be replaced with a room where the few customers could wait for their drugs to be supplied from the warehouse. However, given the importance that the Society attached to its public image, it was unsurprising that it did not follow this piece of advice, something that Messrs Evans had anticipated.[118] Thus despite the "unanimous approval"[119] of Messrs Evans' report, the Society did not fully implement it. However, the fact that the report was commissioned at all marked a distinct change in the Society's approach to its pharmaceutical trade and a realisation that reform was necessary if the trade was to survive in such a competitive pharmaceutical marketplace.

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[115] Shelley's responsibilities were detailed in a letter covering thirteen points from Messrs Evans, 15 December 1914 (E/7 Loose Papers, Box 5).

[116] This and other deficiencies in the department were highlighted in Evans' Report, 1914, pp. 5-7.

[117] Jones' promotion is never mentioned in the minutes. He is still described as "of the Analytical Department" in 1917 (MCM 24 July 1917).

[118] Evans' Report, 1914, p. 13.

[119] Special Report, 1914, p. 3.

Conclusion

The events of the decade following Chattaway's death demonstrated that the Hall pharmaceutical trade still had certain strengths, with the Society's close ties with public institutions, government bodies and medicine especially important. The Society's ability to provide customers, both at home and overseas, with large quantities of drugs packaged in as small a quantity as required was a unique selling point and one for which there was still a market. Combined with innovations in physiological testing, supplies to the Metropolitan Asylums Board, minor public services and small hospitals, along with continued, albeit reduced, purchases from the Crown Agents, there was a still a demand for the Society's high-quality drugs and specialist service. Although, as Messrs Evans' report highlighted, the Hall trade could not compete in the pharmaceutical marketplace, it could be undertaken as a public service. Furthermore, if its administration was altered and running costs reduced, it should have been able to break even. Consequently, the Society entered 1915 with the attitude that its pursuit of a niche role in public service was viable, if unprofitable. However, 1914 had seen the outbreak of war on an unparalleled scale, which would place further demands on the Society's faltering pharmaceutical trade.

CHAPTER TEN

The End of the Pharmaceutical Trade at Apothecaries' Hall, 1914-1922

This final chapter examines the reasons why the Hall pharmaceutical trade closed in 1922, after 250 years of the Society of Apothecaries manufacturing and supplying high-quality drugs. Major differences between the Society's trade and the rest of the British pharmaceutical industry had been apparent for a considerable time, whilst the impressive profits made from supplying India and the Navy seemed only a distant memory. Despite this, following the introduction of physiological drug testing and an independent enquiry into the trade in 1914, the Society was content fulfilling its public service remit of supplying high-quality drugs with a specialist service to a small group of valued customers. However, the impact of the First World War made this increasingly different. Whilst the war was a catalyst for development at other firms, the further changes that it brought were too much for the Hall trade to cope with. Unable to deal with fluctuations in drug prices, demand for mass-produced drugs, previously unknown industrial disputes and a failure to break even, the Society's will to continue its role as a guarantor of drug quality through the pursuit of a pharmaceutical trade weakened. However, although the Society attributed the closure of the Hall trade to labour disputes, it was a much more complex process, with the conflicting interests of the Society's tripartite nature again paramount.

The First World War and its Impact on the Hall Trade

The outbreak of the First World War rapidly highlighted Britain's dependence on German pharmaceuticals, as drugs such as phenacetin, salvarsan, novocaine and aspirin were no

longer available.[1] The case of the pharmaceutical industry is frequently cited as an example of the decline of British industry,[2] although a supposed cause of this, the absence of research and development, has been questioned.[3] However, the war did act as a catalyst for development across all sectors of industry,[4] including pharmaceuticals. May and Baker, in an agreement with Les Establissements Poulenc Frères of Paris, moved into the field of organic arsenicals, whilst Boots diversified into fine chemical manufacture, producing phenacetin, atropine and saccharin.[5] Meanwhile, Howards and Sons manufactured aspirin and Burroughs Wellcome developed a salvarsan equivalent.[6] After these developments, sixteen medicinal chemicals, for which Germany previously had a virtual monopoly, were manufactured commercially in the United Kingdom by the end of the war.[7]

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[1] Liebenau, 1984; Robson, 1988.

[2] Bernard Elbaum and William Lazonick (eds.), *The Decline of the British Economy* (Oxford, 1986); For the pharmaceutical industry see A. Chandler, *Scale and Scope: The Dynamics of Industrial Capitalism* (Cambridge, Massachusetts, 1990), pp. 278-9, 284-5, 373-5.

[3] D.E.H. Edgerton and S.M. Horrocks, "British Industrial Research and Development before 1945", *Economic History Review,* **47** (1994), pp. 213-38; David Edgerton, *Science, technology and the British industrial 'decline'* (Cambridge, 1996); James Foreman-Peck, "The Balance of Technological Transfers, 1970-1914", in Jean Pierre Dormois and Michael Dintenfass (eds.), *British Industrial Decline* (London, 1999), pp. 114-38.

[4] Corelli Barnett, "The Audit of the Great War on British Technology", in Dormois and Dintenfass, pp. 103-13.

[5] Slinn, 1984, pp. 89-94; Stanley Chapman, *Jesse Boot of Boots the Chemists: A Study in Business History* (London, 1974), pp. 96-101.

[6] B.F. Howard, 1956, p. 21; E.M. Tansey, "Medicines and Men: Burroughs Wellcome and Co. and the British Drug Industry before the Second World War", *Journal of the Royal Society of Medicine,* **95** (2002), pp. 411-6.

[7] Memorandum on the Special Measures taken by the National Health Insurance Commission in relation to the Supply of Drugs and other Medicinal Stores during the War, 1919 (Cd. 183), XXXIX (hereafter cited as Drug Memorandum, 1919), p. 10.

Compared to the major changes elsewhere in the industry, the Hall trade was less affected, as its small size and manufacturing capacity meant that it could only be of limited help to many of its former government customers. In October 1914 letters were sent to the Directors of the Army and Navy Contracts offering the Society's assistance in the "present crisis",[8] but both declined. The First World War was the first war where the mass-production of supplies was crucial,[9] but the Society simply could not deal in these quantities of drugs. Whilst other pharmaceutical firms adapted to the new trading conditions, the Society carried on as before and could do little more than offer specialist services. An indication of the status to which the Society had declined, both as a pharmaceutical firm and corporately, came through its lack of involvement in any of the pharmaceutical industry or medical committees set up to co-ordinate the war effort.[10] However, various members of the Society did contribute on an individual basis.

Although the military did not require Hall drugs, the Society was keen to assist the war effort. This was not only a reflection of its public service ethos, but also of the continued activity in its analytical laboratories. In early August 1914, due to the shortage of German chemicals, Frederick Shelley prepared a report on whether any could be manufactured in the Society's laboratories.[11] The report's details are unknown, but Shelley advised the Managing Committee that he would communicate with the Director of the Commercial Intelligence Branch of the Board of Trade as a result.

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[8] T/22 Letter Book, 1913-22, nos. 98 and 99, 6 October 1914.

[9] Arthur Marwick, *Britain in the Century of Total War: War, Peace and Social Change, 1900-67* (London, 1968). For the relations of war and medicine see Roger Cooter, "War and Modern Medicine", in W.F. Bynum and R. Porter (eds.), *The Companion Encyclopaedia of the History of Medicine* (London, 1993), pp. 1536-73.

[10] *Chemist and Druggist,* **85** (1914), pp. 360-1.

[11] MCM 15 August 1914.

Although the Society registered "Velysol" in 1915 as a trade name for liquor creosotis saponatus, probably due to the increased wartime demand for such surgical disinfectants,[12] the Society's main contribution to the war effort came through the provision of analytical services. Shelley examined samples of sputa and swabs for the General Post Office without any charge until the end of 1916.[13] This bacteriological investigation was quite different from the analytical services typically provided by the Society and confirmed the Society's objective to assist its customers to the best of its ability. However, there is evidence that the Hall trade had undertaken similar work during Chattaway's tenure as manager.[14] Shelley certainly tried to take the initiative regarding assisting to the war effort, as following an appeal from the Institute of Chemistry he offered to carry out government work in the Society's laboratories.[15] Meanwhile Arthur Jones, the assistant analyst, analysed the constituents of some phosphor cakes believed to be of German origin and hence unobtainable. As a result, phosphor cakes made according to Jones' formula were manufactured in the Hall laboratories from early 1916. The cakes produced a phosphor bronze that passed the Woolwich Arsenal tests for the manufacture of war munitions and the metal produced was used in guns and aeroplanes.[16] This work was quite a departure from pharmaceutical manufacturing and again illustrated the adaptability and versatility of the core chemical skills of the Hall's staff, a contrast to the rigidity of the institution in which they worked.

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[12] MCM 10 August, 9, 16 November 1915.

[13] After this date he only continued to work for the Post Office Military Hospital free of charge (MCM 28 November 1916).

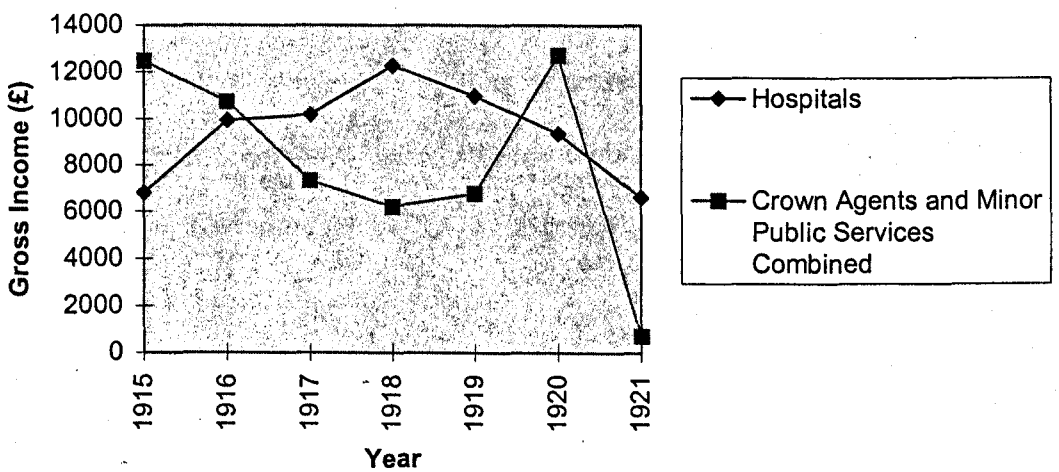
[14] Moor Report, 1904.

[15] MCM 11 August 1914. There are no references in the Society's archives to any government work occurring. For the Institute's wartime role in recruiting chemists, see Russell at al., p. 196.

[16] MCM 24 July 1917.

Although the Society could not provide drugs on the scale demanded by the military, the Society's turnover did increase during the war. However, other pharmaceutical firms experienced a much greater increase in demand. For example, May and Baker's turnover rose from £250,000 in 1913 to over £800,000 in 1916,[17] whilst the Society's increased from £17,821 to £27,445. Meanwhile, at Howards, sales rose from £275,000 to over £600,000 during the same period.[18] The main increase in demand for Hall drugs came from hospitals that the Society already supplied. These orders grew steadily and overtook the combined sales to the Crown Agents and Minor Public Services as the trade's largest income, as is illustrated in the graph below.[19] Collectively, these institutions were an essential part of the Society's trade, as although their orders were small, they were regular and generally unproblematic, whilst customers such as the Willesden Guardians and Croydon Mental Hospital continued to purchase drugs until the trade's closure.

Gross Income from Hospital and Crown Agent and Minor Public Service Customers, 1915-21



[17] Slinn, 1984, p. 79.

[18] Howards and Sons, Sales Figures, Redbridge Local Studies and Archives Service.

[19] Data from T/11, Private Ledger, 1915-21. Although the ledger's headings describe the income as from the Crown Agents, from the figures it appears that from 1915 this was combined with that of the Minor Public Services.

Although the Society's relationship with the Crown Agents remained strong and orders were buoyant from 1914-16, the disruption of shipping by German submarine action caused purchases to drop in the war's latter years. Further difficulties arose from the prohibition orders placed on the export of certain chemicals.[20] This ended the Society's arrangement with E. J. Mahady Company of Boston, which had given the latter rights to the exclusive sale of the Society's liquid paraffin in the United States since 1913.[21] However, the effect of prohibition orders on firms such as May and Baker and Howards was greater due to the importance of their overseas trade.[22]

The war exposed even more starkly the underlying inefficiencies in the Hall trade, highlighting the long-term problem of how, because of the large expense of running the Hall trade, profits did not rise in proportion to turnover. The report compiled by Messrs Evans in 1914 had already stated that running costs, especially the amount spent on salaries, were too high in relation to the profits generated. However, due to increases in the cost of living,[23] the war brought rapid rises in the price of drugs and the wages of employees. Thus the already high running expenses of the trade increased, outweighing any rise in turnover. An exception to this trend occurred in 1918 when profits exceeded £1,000 for the first time since 1909, a result of increased business in the retail department during the influenza epidemic.[24]

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[20] Drug Memorandum, 1919, pp. 5-6; *Chemist and Druggist,* **85** (1914) p. 239. The list of prohibited chemicals initially numbered twenty-four, but this expanded as the war progressed.

[21] T/22, Letter Book, no. 43, 29 December 1913, no. 52, 20 February 1914 and no. 97, 2 October 1914. The arrangement resumed after the war.

[22] Robson, 1988, pp. 88-9.

[23] Robson, 1988, p. 87; Jon Lawrence, "The First World War and its aftermath", in Paul Johnson (ed.), *Twentieth Century Britain: Economic, Social and Cultural Change* (London, 1994), pp. 151-68.

[24] MCM 29 October 1918.

Turnover and Profits of the Hall Trade, 1912-18

Year	1912	1913	1914	1915	1916	1917	1918
Turnover[25](£)	18,821	17,821	-	27,413	27,445	23,230	26,502
Profit (£)	46	152	274	291	612	-322	1340

The fluctuations in drug prices also led to problems fulfilling contracts. Frequently drug prices increased to such an extent that to supply under the terms originally negotiated would result in a loss. For example, the Society had to explain the increase in drug prices beyond the limits set by colonies to the Crown Agents in 1915.[26] Meanwhile the refusal of the Metropolitan Asylums Board to renegotiate or release the Society from its contract to supply them[27] led to a loss and the Society's refusal to tender in the following year.[28] The small scale of the Society's trade made it less able than larger firms to cope with the financial demands caused by price fluctuations and consequently it shortened its hospital and institutional contracts, typically from a year to six months.[29]

The small scale of the Society's trading operation also led to problems with manpower during the war. Whilst the difficulties caused by the loss of skilled men were eased for many pharmaceutical firms when the Ministry of Munitions was formed in 1915 and key

[25] After 1913 annual statements of trade are no longer given, so the turnover figures from 1915-18 are approximations based on data from T/11, Private Ledger. However, unlike previous turnover data, the small income from analysis is omitted, whilst retail income is obtained from totalling cash and credit sales.

[26] T/22, Letter Book, nos. 133 and 134, 31 March, 8 April 1915

[27] The Hall trade regained the supply of drugs when it won the contract jointly with British Drug Houses in 1915 (Proceedings of Managers, MAB 63, vol. 49, 20 March 1915; MCM 30 March 1915).

[28] MCM 8 June, 10 October 1915, 15 February 1916; Clerk's Letters, A.M. Watson to Clerk, Metropolitan Asylums Board, 13 October 1915, p. 186.

[29] Order details taken from MCM T/31, T/32 and T/33 and Letter Books T/22 and T/23.

workers could be exempted from military service,[30] the Society had to make strenuous efforts to hold on to essential staff, especially once conscription was introduced in 1916.[31] However, the impact on the Society was ameliorated, as many of its most experienced employees were not subject to conscription.[32] Additionally, as occurred throughout industry,[33] women replaced some of the men who left to fight. The new female staff members mostly worked in the pharmacy and office, although Miss Lynch, who held the dispensing qualifications of the both the Pharmaceutical and the Apothecaries' Society was employed in 1916 to assist in the analytical laboratory.[34]

Due to the Society's public service ethos, the difficulties of trading during the war and the low profits gave no immediate cause for concern. Writing to the Ministry of Health in 1920, the Society's Clerk, Arthur Bingham Watson,[35] emphasised that "the Society has no desire to make a profit out of the manufacture and sale of drugs and has in recent years only continued this branch of work out of a desire to maintain, regardless of cost, the highest standard of quality and purity in all kinds of drugs".[36]

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[30] For example after the outbreak of war staff levels at Howards were much depleted, although key workers returned in 1916 (B.F. Howard, 1956, pp. 20-21). See also Arthur Marwick, *The Deluge: British Society and the First World War* (Basingstoke, 1991), pp. 99-102.

[31] A tribunal of the Military Advisory Board to the City of London exempted the accountant, a laboratory workman and the pill-maker from military service. However, a clerk had to enlist when the Society's appeal against the tribunal's decision failed (MCM 22 August, 12 December 1916, 13 February 1917).

[32] Forty-four percent of employees had been aged over forty in 1912 and conscription only applied to all men aged 18-41.

[33] Marwick, 1968, pp. 105-11.

[34] MCM 22 February, 21, 28 November 1916.

[35] Whittet, 1977, p. 21.

[36] Clerk's Letters, A.B. Watson to Sir George Newman, 13 May 1920, pp. 351-3.

Despite these comments the Society could not ignore the trade's financial position entirely, as not only was it important to maintain sufficient working capital to run the trade,[37] but also the Society's finances were increasingly unstable. The Court of Assistants was concerned over the reduction in membership and the subsequent decreasing income,[38] so it could not afford to maintain a trade that continued to make a loss. Thus although the loss of £322 made in 1917 may seem small, the fact that the trade did not break even had a major impact on the Society. As was typical of the Society's slowness to act, it was not until October 1918 that a Special Court of Assistants was called and, for the first time since 1880, discontinuing the trade was formally discussed.[39] Although Algernon Dutton Brenchley, who had been elected to the Court in 1917, proposed that the Society should cease trading immediately, he received no support and instead the typical Society solution to problems was agreed upon: a special committee was appointed to decide on further action.

The special committee met during October and decided "that at a suitable date the Trade should be discontinued".[40] However, there was a certain reluctance to make a final decision, so any action was deferred until the war's end. Ultimately the trade's closure

[37] For example, in 1916 the Court of Assistants repaid an advance from the trade to provide it with a better working balance following the increase in drug prices (CM 14 March 1916).

[38] The Society's finances were generally cloaked in secrecy and it is only because of Thomas Wakefield's (Master 1923-4) investigation during the 1920s that a clearer picture can be obtained. For example, although there was a small surplus in the Society's income over expenditure in 1917, a deficit occurred in both 1922 and 1923 (D5 Financial Papers, Thomas Wakefield's Notes on the Society's Finances, 1917 and 1920s). For concern and action taken regarding the decrease in membership, see CM 11 February, 11 March 1919; PC 4 March 1919; SCA 25 March 1919.

[39] CM 13 August, 1 October 1918.

[40] Reported at Court of Assistants on 10 December 1918, but only quoted in "Report of the Private Court as to Closing the Trade and the development of the Trade premises", Special Private Court (SPC) 19 July 1920.

would be postponed for almost four years. When the Court of Assistants next met in December, no action was taken because 1918 had seen an increase in business.

Laboratory Activity

Despite the trade's uncertain future, the post-war period saw continued activity in its laboratories, primarily due to the encouragement of Frederick Shelley. When Arthur Jones left in 1918, he was replaced in the analytical laboratory by Victor Cofman, who had qualified as a chemist through the examinations of the Pharmaceutical Society and a London BSc. In addition to his analytical work for the Hall trade, Cofman undertook applied research in the Society's analytical laboratories. This focussed on pharmacopoeial standards, examining the bitter, Japanese chiretta, and chaulmoogra oil, used in the treatment of leprosy and of particular interest following F.B. Power's comprehensive analysis at the Wellcome Chemical Research Laboratories in 1904.[41] Research on pharmacopoeial standards remained important when Jules Cofman-Nicoresti was employed in the Hall analytical laboratory.[42] Cofman-Nicoresti was involved in the Hall's work on physiological drug standardisation and he wrote a paper highlighting improvements made to the Society's standards.[43]

Although the chemical activity at Apothecaries' Hall was less extensive than during Chattaway's tenure, the applied research undertaken covered similar topics. Additionally

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[41] Victor Cofman, "Note on Japanese Chiretta", *Pharmaceutical Journal,* **103** (1919), pp. 82-3; *Ibid.*, "The Acidity of Chaulmoogra Oil", *Pharmaceutical Journal,* **103** (1919), p. 269; John Parascandola, "Chaulmoogra Oil and the Treatment of Leprosy", *Pharmacy in History,* **45** no. 2 (2003), pp. 47-57.

[42] Jules was appointed soon after Victor Cofman resigned in September 1919, although I have been unable to establish if a familial relationship existed between them. Jules' research included work on guaiacol, an external antiseptic, and the adulteration of olive oil.

[43] J. Cofman-Nicoresti, "Physiological Standardisation", *Pharmaceutical Journal*, **104** (1920), p. 195.

the Society continued its role in providing laboratory infrastructure. Snow Blagburn Tallantyre, who had been a locum analytical assistant at the Hall in 1912 and was now a chemist at the Gas Light and Coke Co. in Beckton, was granted permission to undertake research in the analytical laboratory in October 1919[44] and worked on quillaia bark, an expectorant, with Cofman-Nicoresti.[45] Although Shelley published little research himself,[46] his contribution to all of the work mentioned above was vital, with his assistance and the use of the Hall laboratories acknowledged by these chemists in their papers.[47]

An Alternative Role for the Hall Laboratories?

The increasing uncertainty over the trade's future led the Society to consider alternatives as to how it could continue its role as a guarantor of drug quality without operating a pharmaceutical trade. In 1918, Shirley Murphy, the most distinguished member of the Court of Assistants during the final years of the trade, proposed that the Hall trade could standardise anti-toxin sera, thus furthering its work in ensuring drug quality.[48] The importance of drug standardisation to the Society was illustrated in its evidence to a committee convened by the Ministry of Health on controlling the quality and authenticity of therapeutic substances in June 1920. In their evidence, the Society's representatives,

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[44] MCM 10 September 1912, 21 October 1919.

[45] Jules Cofman-Nicoresti and Snow B. Tallantyre, "An Examination of Quillaia Bark and Commercial Saponins", *Pharmaceutical Journal,* **105** (1920), pp. 94-7.

[46] The only papers that it has been possible to locate are: F.F. Shelley, "Standardisation of Dried Carica Papaya Juice", *The Analyst,* **39** (1914), p. 170; *Ibid.*, "Ballier's modified test for arachis oil", *The Analyst,* **50** (1925), p. 182; *Ibid.*, "Halpen's Cotton Seed Oil Test", *The Analyst,* **50** (1925), p. 132.

[47] See papers listed above on chaulmoogra oil, physiological standardisation and quillaia bark.

[48] MCM 19 February 1918. Murphy was delegated to approach the proper authority with the proposal, but no further references occur. For biography see Appendix B.

Shirley Murphy and Walter Dixon, argued for physiological testing to be made statutory.[49] The Society saw a future role for itself in this work and, in a letter to Sir George Newman, Chief Medical Officer at the Ministry of Health, in May 1920, the Clerk suggested that the Society could establish a government facility for drug standardisation at Apothecaries' Hall.[50] The Society believed that it would be to its benefit if it undertook "a part of the proposed testing and standardisation of drugs, even at the expense of discontinuing the trade department".[51]

The plans did not materialise[52] as a government laboratory already existed to take on the Society's proposed role. The recently founded Medical Research Council was instructed to perform and also research drug standardisation,[53] confirming how the Society's role guaranteeing drug quality had been superseded. Following the Therapeutic Substances Act of 1925, which made the biological standardisation of certain substances statutory,[54] a role

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[49] Report of the Departmental Committee appointed to consider and advise upon the legislative and administrative measures to be taken for the effective control of the authenticity of such therapeutic substances offered for sale to the public as cannot be tested adequately by direct chemical means, 1921 (Cd. 1156), XIII (hereafter cited as Therapeutic Substances Committee, 1921) p. 5.

[50] Clerk's Letters, 13 May 1920, pp. 351-3.

[51] SPC 4 June 1902.

[52] A reply from the Ministry of Health was read at the Court of Assistants on 8 June, but its contents were not given. The project remained a possibility when the future of the site was discussed at the end of June, but this was the last reference (Clerk's Letters, A.B. Watson to Sir William Wells, 29 June 1920, p. 375).

[53] Therapeutic Substances Committee, 1921, p. 10. The central institute of the Medical Research Committee was set up at Hampstead in 1914 and became the National Institute for Medical Research in 1920. Joan Austoker and Linda Bryder, " National Institute for Medical Research and the related activities of the Medical Research Council", in Joan Austoker and Linda Bryder (eds.), *Historical Perspectives on the Role of the MRC: Essays in the history of the MRC of the UK and its predecessor the Medical Research Committee, 1913-1953* (Oxford, 1989), pp. 35-57.

[54] Matthews, 1962, pp. 379-80.

well suited for the Hall arose. Ironically, by this date the Hall laboratories no longer existed, whilst the Pharmaceutical Society opened pharmacological laboratories in 1926 to undertake the commercial testing of drugs for manufacturers.[55]

Employee Difficulties

Further evidence of the changing environment in which the Hall trade was operating came from the industrial discontent that surfaced amongst its staff after the end of the First World War. Before the war the Society was used to dealing with its staff in a paternalistic manner, with salary rises based on length of service.[56] The Society's expectations of its staff were typical of many small businesses at this time, valuing the independence of its enterprise, resisting organisational change and expecting complete loyalty from its employees.[57] However, the First World War changed workers' expectations and because pre-war wages in the drug trade were exceedingly low and did not reflect the skills involved, demands for increases soon arose.[58] Trade union membership had grown steadily before the war,[59] and there was also an increasing trend amongst those working in

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[55] The laboratories had additional purposes for research and training pharmacists in pharmacological testing, "Pharmaceutical Society of Great Britain: Opening of the Pharmacological Laboratories", *Pharmaceutical Journal,* **116** (1926), pp. 642-6.

[56] For procedures regarding salary rises see MCM 23 January 1906, 25 January 1913.

[57] Giorgio Pellicelli, "Management and Social Conditions at the beginning of the 1920s", in Carlo M. Cipolla (ed.), *Fontana Economic History of Europe, vol. 5, The Twentieth Century,* part 1 (Hassocks, 1977), pp. 184-217.

[58] "The Industrial Problems in the Drug Trade", *Chemist and Druggist,* **92** (1920), pp. 141-5.

[59] Peter Wordley, "Edwardian Britain: Empire, Income and Political Discontent", in Paul Johnson, 1994, pp. 57-78. Organisation in the drug trade developed in London in 1912 and 1913. Shirley Lerner, *Breakaway Unions and the Small Trade Union* (London, 1961), p. 14.

scientific fields to become involved in union activity.[60] Towards the end of the war many of the Hall's employees joined the National Warehouse and General Workers Union, (hereafter NWGWU).[61] This was one of various unions, such as the National Union of General Workers and the Amalgamated Union of Shop Assistants, Warehousemen and Clerks which represented workers in the drug trade.[62] Whereas before 1914 the Society had negotiated with individual employees about wages, it now had to deal with the NWGWU and increasingly discontented workers, with the sharp rise in the cost of living[63] fuelling demands for pay rises.

The Society was in an unusual position when dealing with pay demands. The NWGWU, in combination with other unions, made agreements on behalf of its members with a new negotiating body, the Drug and Fine Chemical Manufacturers' Association (hereafter DFCMA).[64] Although the Society was not a member of the DFCMA, when a settlement was agreed, the NWGWU then contacted the Society demanding that it raise its wages accordingly.

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[60] Roy MacLeod and Kay MacLeod, "The Contradictions of Professionalism: Scientists, Trade Unionism and the First World War", *Social Studies of Science,* **9** (1979), pp. 1-32; Donnelly, 1996, pp. 787-9.

[61] The NWGWU was based in Liverpool and later became affiliated to the National Federation of Tobacco Workers (Arthur Marsh and Victoria Ryan, *Historical Directory of Trade Unions*, vol. 3 (Aldershot, 1987), p. 488). Although Marsh and Ryan do not refer to any involvement in the drug industry, the union represented a number of its workers.

[62] *Drug Trade News and Chemical Workers Gazette,* **1** no. 1, (1919), p. 11.

[63] Jon Lawrence, 1994, p. 156.

[64] For information on the DFCMA see "Statement by the Association of Drug and Fine Chemical Manufacturers", *Chemist and Druggist,* **92** (1920), p. 649; Lerner, 1961, p. 17; Lesley Richmond, Julie Stevenson and Alison Turton (eds.), *The Pharmaceutical Industry: a guide to historical records* (Aldershot, 2003), p. 396.

Following two pay rises in 1919[65] there was a fear that trading for the year would result in a loss. At the December Court of Assistants, Algernon Brenchley again proposed that the Society should become a purely licensing body.[66] He was defeated, but the expenses of running the trade grew as further pay increases were given. When the subject of closure arose at the Court of Assistants in February 1920, typically the Society postponed any decision until the 1919 accounts would be considered at the August Court.[67] Faced with the Court's indecision, it was left to Shelley, guided by the Clerk's advice, to continue with the trade despite its uncertain future and further pay demands.[68]

The Society was not alone in facing unwelcome demands for increased wages. When the unions representing the drug workers and the employers failed to reach an agreement in April 1920, the case went before the Industrial Court.[69] This found in favour of the employers, but disappointed with the judgement, on 10 May 1920 members of the NWGWU employed at Evans Sons, Lescher and Webb went on strike.[70] The following day about seventy percent of the Hall trade's employees, also NWGWU members, followed suit.[71] Only staff from the retail department and office, along with Jules Cofman-Nicoresti and Shelley remained at work.

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[65] Clerk's Letters, A.B. Watson to NWGWU, 4 April 1919, p. 25, 1 October 1919, p. 210.

[66] CM 9 December 1919.

[67] CM 10 February 1920.

[68] In March 1920, six assistants, led by A.J. Pratt, the laboratory foreman, requested a further pay rise, which was granted in part (MCM 16 March 1920).

[69] This was set up by the Ministry of Labour in 1919 to settle industrial disputes.

[70] "Drug Workers' Strike", *Chemist and Druggist,* **92** (1920) pp. 648-9, 676-7; "Drug Workers' Strike", *Pharmaceutical Journal,* **104** (1920), p. 501.

[71] MCM 11 May 1920. This is based on an estimated workforce of thirty. Burroughs Wellcome was amongst the other firms affected.

The strike severely affected the Society, as it had never experienced such hostile action from its staff before, whilst, as no increase in wages had been applied for, it was unaware of the strikers' motivations.[72] The strike was not recognised by the NWGWU and, although it supported its members' grievances, it instructed them to return to work. There was concern that the strike would undermine co-operation with management and anyway the unions could request a renegotiation of terms in the following month.[73] The strike ended unconditionally after a fortnight, with the Society's employees returning to work as well.[74] Whilst those who had not gone on strike were rewarded,[75] the Society felt deeply betrayed by the disloyalty of its other workers. Consequently, its attitude towards its employees changed distinctly, something that was reflected by the absence of gratuities on the trade's closure to long serving employees who had participated in the strike.[76]

The Closure of the Trade at Apothecaries' Hall

Following an agreement between the DFCMA and the unions representing the drug workers, in July 1920 the Society was faced with another pay demand, costing £750 per annum.[77] With the trade still in financial difficulties and coming so soon after the strike, these demands appeared unacceptable. At the Special Private Court on 9 July 1920 it was

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[72] Surviving records suggest that the Society was unaware of the proceedings of the April Industrial Court, and in December 1920 it was still complaining that it had never been informed of the reason for the strike. Report of the Private Court with reference to applications for compensation made by trade employees, 7 December 1920, located in CM 14 December 1920 (hereafter cited as Private Court Report, 1920).

[73] "Drug Workers' Strike", *Chemist and Druggist,* **92** (1920), p. 649.

[74] "Drug Workers' Strike Ended", *Chemist and Druggist,* **92** (1920), p. 716; MCM 25 May 1920.

[75] They were paid at a time and a quarter for its duration.

[76] For example, A.J. Pratt and J.W. Clarke had served the trade for thirty-eight and thirty-three years respectively, but were not given a gratuity (Private Court Report, 1920).

[77] MCM 6 July 1920; SPC 19 July 1920.

"resolved to recommend to the Court to close the trade at once and to consider the best method of dealing with the trade premises".[78] The pay rises were held responsible for the loss of £36 made in 1919 and, whilst this sum was negligible, it was sufficient to emphasise the trade's poor financial prospects. Additionally, the ill-feeling generated towards the striking employees combined with the probability that industrial disputes would continue, meant that the Society had lost the will to continue its pharmaceutical trade.

Consequently, it was proposed that the wholesale trade would close at the end of the year. This date provided sufficient time to complete or transfer all pending contracts and to use or sell off the remaining stock of drugs. Sir William Wells, the senior partner of Messrs Chesterton and Sons, a firm of auctioneers, house and estate agents, valuers and surveyors, was to advise the Society about letting the trade premises.[79] In the second half of 1920 the Hall trade was gradually scaled down and employees given notice.[80] However, although the trade premises were centrally located, it was difficult to find any tenants,[81] whilst the Society was very reluctant to sell the freehold. The trade's future remained undecided, with a further delay to closure occurring when the gross income for the first three quarters of 1920 was found to have increased by nearly £6,000 on the previous year.[82] Understandably the Society was disinclined to close a trade which had survived for so long and been a key reason for its existence.

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[78] SPC 9 July 1920. Despite this recommendation, many of the trade's employees received a wage increase (MCM 13, 27 July 1920) indicating how the Society felt obliged to follow the terms negotiated by the unions with the DFCMA.

[79] SPC and SCA 19 July 1920.

[80] Clerk's Letters, A.B. Watson to W.N. Hamment and others, 18 November 1920, p. 473.

[81] SPC 5 October 1920.

[82] CM 14 December 1920.

The influence of the Society's Clerk, Arthur Watson, was also significant. As he was reluctant to close the Hall trade, he considered alternatives. He suggested that a company could be formed to lease the wholesale and retail premises under terms whereby "the Society would guarantee the standard of drugs sold by their imprint".[83] Although this company would be unable to call itself the Society of Apothecaries, it would work under its auspices. Additionally as an independent board would administer it, the Court of Assistants would be free from any involvement in employment disputes. Watson's emotional attachment to the trade was evident, as in a letter to Sir William Wells he wrote: "I must say that every time I go over the old place it goes to my heart to abandon the trade. It is a pitiful result of the introduction of Trade Unionism among our staff that this historic piece of Old London should be closed. I shall be thankful for any decent excuse to keep it going".[84] Although Watson's view is often taken as the reason for the trade's closure, the reasons behind it were more complex.

In the absence of knowing what other action to take, in February 1921, the Society decided that the Hall trade was "to be carried on as at present".[85] However this was difficult, as trading opportunities had already been turned away. For example, the trade's uncertain future and the decision to end its export business meant that the Society had been unable to enter into contracts with the Crown Agents, so these orders dropped from £12,000 in 1920 to £718 in 1921.[86] Meanwhile, although turnover had increased to over £33,000 in 1920, this did not outweigh the increase in expenditure from the numerous pay rises and a loss of £577 was made in that year.[87] By April 1921, the plans to sell the

[83] Clerk's Letters, A.B. Watson to F.F. Shelley, 16 December 1920, pp. 496-8.

[84] Clerk's Letters, A.B. Watson to W. Wells, 18 April 1921, p. 87.

[85] CM 8 February 1921.

[86] T/10 Ledger; Clerk's Letters, A.B. Watson to Crown Agents, 23 December 1920, p. 5.

[87] CM 8 March 1921; PC 3 May 1921.

business, find another pharmaceutical firm to take over, or let the site had come to nothing. Consequently, Shelley felt it was necessary to stop the protracted discussions and make a decision. Either the stock and fixtures should be sold, the money invested and the Society would wait for a tenant, or the trade would carry on for as long as possible with a reduced staff.[88] However, the actions of the Court of Assistants only confirmed its reluctance to make major changes. At a time when worries about financial losses were paramount, it failed to introduce sufficient checks on the trade's finances and remained split on whether the freehold of the trading premises should be sold, so the decision was again postponed.[89]

It was a loss of £2,695, the largest in the trade's history, which finally forced the Society to close its trade. The Society took the loss as a reflection on the futility of its trading enterprise when faced with spiralling pay demands, but it was also a consequence of the economic conditions. The post-war boom had abruptly ended. Increasing foreign competition as the German chemical industry recovered from the war, combined with the economic depression in the United Kingdom,[90] led to a downturn in trade in the pharmaceutical industry. Whilst the Society does not cite these economic conditions as a reason for the trade's closure, they were very important. Although May and Baker's losses of £10,888 in 1921 were much greater than the Society's, it was a large enough concern to sustain its operation through such a downturn.[91] For the Society, a loss of over £2,500 was disastrous. In an already precarious financial position, it did not have

[88] Comments reported in Clerk's Letters, A.B. Watson to W. Wells, 18 April 1921, p. 87.

[89] CM 14 June 1921; Clerk's Letters, A.B. Watson to F.F. Shelley, 17 June 1921, p. 116; CM 11 October 1921. On this occasion, the Master William Burgess, gave the casting vote against selling the freehold.

[90] On the post-war slump, see Lawrence, 1994, pp. 163-4; Dudley Baines, "The Onset of Depression", in Johnson, 1994, pp. 169-87.

[91] Slinn, 1984, p. 95. Profits returned in 1922.

the resources to shoulder such a deficit, especially as money was needed for renovations to the Hall and for the Society itself. With its other functions to fulfil, the Society could not jeopardise its own existence by pursuing an unprofitable trade. Although the number of medical practitioners taking the Society's licence had decreased, its future as a licensing corporation was more viable than as a pharmaceutical manufacturer and thus the continuation of the former had to be prioritised.

Furthermore the Hall trade was struggling to compete in the post-war pharmaceutical industry. Messrs Evans' report in 1914 had highlighted the trade's distinct nature and by 1922 the conflicting interests of the Society's three functions were increasingly untenable. The gulf between the Hall and the rest of the industry had grown during the war. Due to military demands, many firms had extended their manufacturing capabilities, but after the war they had to re-adjust their businesses to the new conditions. As demand for traditional products declined, increased importance was given to research and development.[92] In contrast the Hall trade was still continuing to operate as it always had done. Although the years after 1880 had seen it adapt in small ways to changing conditions in the pharmaceutical industry, the culmination of change brought about by the First World War was too much for such a conservative institution to cope with.

Using Howards and Sons as an example, even before the war demand for its traditional lines, such as antimony salts, camphor and mercurials, had reduced[93] because of changing therapeutic practice. According to Bernard Howard, later a director of the firm, "Howards

[92] For a detailed examination of the British Pharmaceutical Industry after the First World War, with a focus on firms with a commitment to research based products, see M.T. Robson, "The Pharmaceutical Industry in Britain and France 1919-1939", PhD Thesis, London School of Economics, 1993.

[93] B.F. Howard, 1956, p. 15.

and Sons were no longer supreme in the fine chemical field"[94] with firms such as British Drug Houses and Boots reducing their market. Action was necessary and in 1919 Howards established a research laboratory, a well-timed development, as after 1925 benzoic acid, antimony salts and mercurials were all discontinued.[95] Although by this date the Hall trade had already closed, Howards' experiences demonstrated the problems of relying on traditional lines. The small-scale manufacture of galenicals and chemicals, which was now the Hall trade's core activity, was no longer sufficient to maintain a pharmaceutical business. By comparison, the activities of Allen and Hanburys illustrate the diversification that was necessary. In 1920, the bulk of their profits came from infant and malted foods rather than drugs. They also established research laboratories after the war and in 1923 they began manufacturing insulin.[96] In contrast, the Hall's emphasis on tradition and public service had tied its trade to past practice and as competition and mass production increased, its gentlemanly enterprise was less viable.

Indeed, the Society was not the only traditional pharmaceutical firm that had difficulties surviving in the post-war trading conditions. Corbyn, Stacey and Co., who were a similar business to the Society, with a long history in the pharmaceutical trade, were wound up only five years after the Hall trade closed.[97] Meanwhile John Bell and Croyden were taken over by Savory and Moore in 1928, with the manufacturing facilities of both firms consolidated in Tottenham,[98] presumably to provide a more stable future. According to *The Chemist and Druggist,* since the war there had "been a marked tendency towards co-

[94] B.F. Howard, 1956, p. 22.

[95] B.F. Howard, 1956, pp. 23-7.

[96] Tweedale, 1990, pp. 126-30.

[97] Richmond et al., pp. 142-4.

[98] "A Chapter of History: Some Particulars Relating to the Amalgamation of Two Old-Established London Houses", *Chemist and Druggist,* **108** (1928), pp. 104-5; Richmond et al., pp. 106-9, 308-12.

operation on the part of firms carrying on businesses of a similar or accessory nature".[99] However, whilst mergers were common in the chemical and pharmaceutical industries after the First World War,[100] this was not an option for the peculiar trade at the Society of Apothecaries.

However, other possibilities for the Hall trade's future were discussed. It was suggested that, to economize, the manufacture of drugs at the Hall could be discontinued. This was unfeasible, as if it occurred the Society "could not give the present guarantee of their quality, which had been the principal reason for the continuance of the Trade for so long".[101] Professional advice from the accountants, Messrs Evans was also sought. However, they could only see a future for the trade if the Society was willing to raise a working capital of £20,000 and to advertise widely. Not only would this have meant a complete turnaround in the Society's approach to drug supply, but it also would have involved an enormous risk to the Society's financial security. With continuing the trade under conditions acceptable to the Society impossible, at the Private Court on 7 February 1922, it was decided to recommend to the Court of Assistants that the wholesale and retail trades should be closed as soon as possible.

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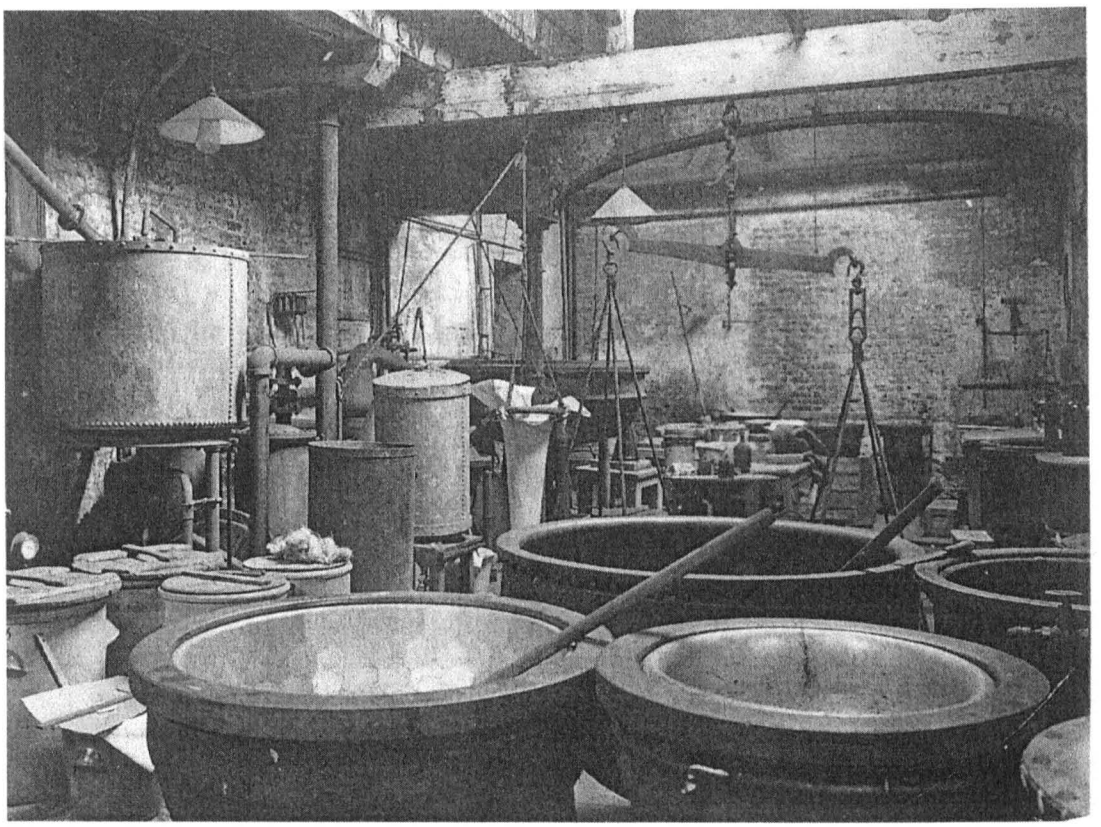
[99] "A Chapter of History: Some Particulars Relating to the Amalgamation of Two Old-Established London Houses", *Chemist and Druggist,* **108** (1928), pp. 104-5, quote from p. 104.

[100] The importance of mergers to enable expansion, facilitate research and development, and thus compete on an international scale was characteristic of the British post-war chemical industry. W.J. Reader, *Imperial Chemical Industries: A History, vol. 1, The Forerunners, 1870-1926* (Oxford, 1970), pp. 249-57, 317-27.

[101] "Closing of Trade Section: Report of the Private Court", PC 7 February 1922 (hereafter cited as PC Report 1922).

Drug Manufacturing Premises at Apothecaries' Hall on the Trade's Closure in 1922



The Fate of the Hall Pharmaceutical Trade

Following the Private Court's recommendation, on 14 February 1922 the Court of Assistants directed the Managing Committee to take the steps required to close the trade.[102] Once a final decision was reached, the closure of the trade came about rapidly, considering the long period of prevarication that had passed since October 1918. There was little to impede its quick closure, as only one contract was pending. The employees were given a month's notice and only a skeleton staff was retained to dispose of the stock, plant and machinery.[103] Messrs Orridge and Co., the valuers of Ludgate Hill who specialised in the sale and transfer of chemists' businesses, were employed to value the stock and plant[104] and to act as arbitrators in their sale. Meanwhile attempts continued to let the trading premises.

During the spring of 1922, both the Hall wholesale and retail trades were sold. The retail trade, including prescription books, formulae, proprietary articles and goodwill, was sold to Messrs Cooper Son and Co., dispensing chemists of Gloucester Road, London, for £1001 7s 4d.[105] On 13 April 1922 the retail department at Apothecaries' Hall closed. The event was widely covered in the press, with reports full of nostalgia for the late trade.[106] It was announced to customers in a circular that the wholesale trade would close on 16 May 1922, and in the following weeks the works finished operating and stock-taking

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[102] CM 14 February 1922.

[103] PC Report, 1922.

[104] E/7 Loose Papers, Box 4, Letter, W. Wells to A.B. Watson, 8 March 1922.

[105] "Some Notable London Pharmacies", *Chemist and Druggist,* **159** (1953), p. 579; E/7 Loose Papers, Box 4, Papers re dissolution of Society's trade and the sale of the retail and wholesale business, stock and plant.

[106] For example, *The Times* described a visit to the pharmacy as "an escape from the twentieth century into more leisured days." "Historic City Drug Shop", *The Times,* 20 April 1922, contained in News Cuttings Book, marked vol. 1919, AHA.

took place.[107] Randall and Wilson, a wholesale druggist from Southampton, purchased what *The Times* called a "famous process book" and the goodwill of the wholesale trade for the sum of £50.[108] It was an indication of how little manufacturing was occurring at the Hall that the wholesale trade could be purchased for such a small sum. Stocks of drugs were sold to customers at a discount of fifteen percent[109] and whatever remained in terms of stock and plant was purchased for £350 by Morton's Cash Chemists, a firm of chemists and druggists that rapidly expanded in London in the 1920s.[110] The Society received a total of £2,761 10s 4d from Messrs Orridge as a result of the sale of all of the assets of its pharmaceutical trade, which meant that once the trade's financial affairs had been finalised the Society was in credit.[111]

Shelley remained an employee of the Society of Apothecaries until after the final meeting of the Managing Committee,[112] and having purchased the laboratory's analytical apparatus for fifty pounds, he continued to practise as an analytical chemist from the

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[107] Circulars from the Society of Apothecaries and Randall and Wilson, May 1922, Royal Pharmaceutical Society, IRA 1996.142; MCM 23, 29 May 1922.

[108] *The Times*, 31 May 1922, contained in E/7 Loose Papers, Box 3; E/7 Loose Papers, Box 5, Agreement with Randall and Wilson. Unfortunately Randall and Wilson's records were destroyed during World War Two (Hunting, 1998, p. 286). For brief information on the firm see Richmond et al., p. 161.

[109] PC 4 April 1922; Clerk's Letters, A.B. Watson to W.F.R. Burgess, 28 March 1922, pp. 270-1.

[110] Clerk's Letters, A.B. Watson to Messrs Orridge, 25 July 1922, p. 402. The only information located on Morton's Cash Chemists comes from *Kelly's Post Office London Directory,* which records three branches in 1920 and fifteen in 1929, but no reference to the firm is found in 1930.

[111] E/7 Loose Papers, Box 4, Letter, Messrs Orridge to W. Wells, 5 September 1922; Clerk's Letters, A.B. Watson to Barclay's Bank, 13 November 1922, p. 479; PC 1 August 1922.

[112] SPC 20 June 1922; MCM 27 June 1922. The Society's committee system altered as a result of the trade's closure, with greater responsibilities for the Private Court (PC 6 June 1922, CM 13 June 1922).

Hall until 1929.[113] However, his practice was not associated with the Society,[114] whilst the arrangement appeared to be temporary until a tenant for a larger part of the vacant premises could be found.[115] The few remaining trade employees had left by the beginning of June 1922, but William Morpeth, the accountant, continued in his post until the end of November to finalise financial matters.[116] Although the closure of the trade in 1922 ended the Society's role guaranteeing drug quality through the manufacture of medicines, its public service ethos remained. The Crown Agents still approached the Society requesting details of previous orders, whilst the Metropolitan Asylums Board enquired where it could obtain a certain drug.[117] It was a testament to the Society's tradition of service that even after its trade had closed it still made considerable efforts to answer its former customers' queries.

Following alterations costing almost £700, various premises along Water Lane were let.[118] However, the site at the rear of the Hall, where the Great Laboratory had stood, was harder to dispose of. Amongst the schemes proposed for the land were for the Society to construct a garage to lease out or to build a Livery Hall to let to livery companies without one.[119] The problem was only resolved when a building lease was

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[113] E/7 Loose Papers, Box 4, Inventory and Letter, W. Wells to A.B. Watson, 27 April 1922; PC 31 May 1922. After leaving his practice at the Hall, Shelley worked as an analytical chemist and gas examiner, operating from 1 Hammersmith Terrace, until his death in 1947 (*Proceedings of the Institute of Chemistry*, 1947, p. 273).

[114] A request to term himself "Analyst to the Society" was turned down (PC 6 March 1923).

[115] The Society refused to increase the period of his tenancy from one month (PC 2 January 1923).

[116] PC 7 November 1922.

[117] Clerk's Letters, A.B. Watson to Crown Agents, 13 April 1923, p. 179 and 19 August 1925, p. 454; A.B. Watson to Clerk, Metropolitan Asylums Board, 9 December 1924, p. 206.

[118] CM 9 May, 9 June 1922; SPC 28 March, 18 September, 2 October, 20 November 1923.

[119] PC 1 February, 15 March 1927; CM 10 May 1927; PC 10 June, 5 July 1927.

agreed with Messrs E.D. Winn, leading to the construction of the office block, Nestor House in 1929.[120] On visiting Apothecaries' Hall today, its splendour as a livery company and medical licensing corporation is quite apparent, but one has to look harder for the signs of its trading past. However, the site of the retail shop on Water Lane is still visible, with the coat of arms now above the entrance to the courtyard. The exterior of the magnesia room remains intact, although there are new offices inside, whilst the old lead cistern from the laboratory stands in the courtyard.

Conclusion

Although the Hall's pharmaceutical trade experienced many problems before 1914, demand for its quality drugs with a high standard of service had continued. However, the First World War dramatically changed the character of British pharmaceutical firms. Enterprises that had previously based their business on the processing of raw drugs, with little thought to product development, realised how it was necessary to extend their manufacturing capabilities to make up for the absence of pharmaceuticals imported from Germany. Combined with a decline in demand for a number of traditional product lines, this led to increased research and development in the industry. Although the Society did undertake some specialist work for the war effort and its chemists remained active in applied research, the Society's drug production was too small-scale for military demands. Meanwhile it struggled to cope with the changed trading conditions. Although the war acted as a catalyst for development in the rest of the British pharmaceutical industry, the Society continued operating its trade as before.

The war's immediate aftermath brought further difficulties for the Society, with increased pay demands from its employees. However, unlike in 1880, when the Society was

[120] Hunting, 1998, p. 103; PC 1 January 1929.

prepared to make changes to enable the trade to continue, the will to persevere was now lost, especially as the Society itself was in financial trouble. Although many pharmaceutical firms experienced a temporary but sharp downturn in turnover in 1921 and survived, the Society did not have the resources or the desire to continue its pharmaceutical trade in the face of significant losses. As a result, all trade at the Hall ceased by the end of May 1922.

By 1922 the contradictions between the Society's three functions had become increasingly untenable. The future of the pharmaceutical industry would involve large investment in research and development, leading to the discovery of new drugs. Marketing and legal techniques would be utilised to promote products and multinational mergers and takeovers would occur.[121] All of these changes were incompatible with the small trading organisation, medical corporation and livery company that was the Society of Apothecaries. A firm with its traditions and background rooted in the seventeenth and eighteenth centuries was able to continue in the nineteenth century, but it could not survive for long in the twentieth.

[121] Jordan Goodman, "Pharmaceutical Industry", in Roger Cooter and John Pickstone (eds.), *Medicine in the Twentieth Century* (London, 2000), pp. 141-54.

Conclusion

The closure of the Society of Apothecaries' pharmaceutical trade in 1922 ended 250 years of drug manufacturing and laboratory activity at Apothecaries' Hall and also the Society's role as a guarantor of drug quality. The Society was left to concentrate on its activities as a medical licensing corporation and livery company, functions that it continues to this day and which have hitherto driven historical analysis. However, during the period 1672 to 1922, the Hall trade was an integral part of the Society. Furthermore, its trading activities have wider significance in the study of institutions and the evolving practices of chemistry, pharmacy and medicine. The Hall trade also provides an insight into the pharmaceutical industry in Britain, indicating that its development is more complex than the traditional depiction of the chemist and druggist expanding manufacturing capacity and moving into wholesaling.

The Society's contrasting roles and responsibilities made it a unique and complex institution and shaped its trading activities. Its reputation as a medical licensing corporation and livery company validated its supply of high-quality drugs at a time when other criteria for judging quality were limited. Its corporate status and gentlemanly approach to commerce also helped to foster relationships with government and public service customers. Meanwhile, the Society's objective to fulfil its remit of public service supply led to its customers benefiting from a high standard of service that few firms could match. This service included providing a full range of medical supplies, dealing with specialist requirements and advising on chemical matters. All these advantages of the Hall's supply were key factors in encouraging custom.

However, the interactions between the Society's roles could also have a negative effect on the trade, something that became increasingly important during the period 1822 to 1922. The trade's activities continued to be influenced by the Society's seventeenth-century foundation, even though the practices of chemistry, pharmacy and medicine became differentiated in the nineteenth century. The Society's institutional complexity, combined with a legacy of past business methods, made the Hall trade unsuited to operating in the changing pharmaceutical marketplace. Furthermore, changes in therapeutic and medical practice, the rise of a consumer culture, improvements in drug standards and growing competition from other pharmaceutical firms all had a major impact on demand for Hall drugs.

As a result of the constraints imposed on the Hall's trading activities by the Society's other two functions, there was limited scope for it to adapt to these changes. Although the central tenet of the trade remained its supply of high-quality drugs, soon after the improvements of 1822 the Society backed away from developing its laboratories. As fewer drugs were manufactured at the Hall, by 1880 large parts of the once impressive Hall laboratories had fallen into disuse. Additionally, the conservative nature of the Society and the GCM impeded any effective change to administrative or business practices. Although the Society's government supply had remained strong until the 1870s, this decade saw the end of custom from the Navy and the India Office. Subtle administrative changes, greater customer awareness of expenditure, the gradual erosion of gentlemanly ties and alternatives to relying on the Society's guarantee of quality and high standard of service created an atmosphere of competition for government supply that was very different from the way that the Society typically conducted its trading operation.

Faced with declining profits and increasing discontent from its proprietors, in 1880 the United Stock was dissolved. However, this did not end trading activity at Apothecaries'

Hall. Motivated by concerns of tradition, finance and status, at a time when its three functions were all under threat, the Society corporately took direct responsibility for the trade. In response to increased competition, a reorganisation followed. However, the Society's conservative approach to managing the trade remained. Although the Hall's responsibilities in medical licensing had diminished and its role as a pharmaceutical authority had been marginalized by the Pharmaceutical Society, its livery and licensing functions continued to constrain the trade's activities.

Nonetheless, within the limitations imposed on it, the Hall trade adapted to the changed demand for its drugs. After 1880 it found a niche market for its specialist service of high-quality drug supply, primarily to public service customers. A key aspect of this niche market was the diverse range of chemical services provided. These services primarily originated from the expertise and initiative of the chemists employed at the Hall, backed up by the infrastructure, reputation and public service ethos of the Society.

The chemist had always been central to the Society's trading activities. During the United Stock, the Hall trade benefited from the skills of three Fellows of the Royal Society, in whose training and activities could be seen the emergence of a profession of chemistry. After 1880 the characteristics of the Hall chemists changed even further, with subsequent occupants of the chief chemical post having standardised qualifications and specialist training, whilst holding new managerial responsibilities. Their various activities in analysis, applied research and consulting indicate the chemist's important role in the development of the British pharmaceutical industry. Indeed, the fact that a significant level of chemical activity occurred in the Hall laboratories, even though it can be seen as an almost obsolete trading entity, suggests that the contributions of the professional chemist and the laboratory to the British pharmaceutical industry require further examination.

The introduction of a physiological drug standardisation service was a further way in which the Society attempted to adapt to the changing pharmaceutical marketplace. However, in the long-term its efforts were inadequate to ensure the Hall trade's survival, as there was an increasing gulf between it and the rest of the British pharmaceutical industry. The Hall trade was reminiscent of a bygone age, whilst the interaction of the Society's three functions was increasingly untenable. As its competitors moved out of central London, developed new manufacturing facilities and advertised widely, the Society was restricted to the unsuitable environment of Apothecaries' Hall and to relying on the goodwill generated by its name to encourage business. Meanwhile, with tendering for drug contracts increasingly competitive, the Society's high prices were an impediment to gaining business, whilst its gentlemanly approach to commerce was anachronistic. As profits from the trade became minimal, the Society continued its trading activities to fulfil its public service remit and its role as a guarantor of drug quality.

Although the First World War acted as a catalyst for change in the pharmaceutical industry, because of its institutional complexity the Society found itself struggling to continue in an industry where mass-production, mergers, and research and development were increasingly important. Additionally, changes in therapeutic practice meant that demand for many of the Society's traditional products had diminished. Although the Society usually blamed the labour disputes that it experienced for its decision to cease trading in 1922, the reasons for the trade's closure were more complex. The culmination of change to the pharmaceutical marketplace following the First World War, combined with a severe downturn in trade in 1921 and the conflicting interests of the Society's tripartite nature, were all significant.

However, given the different pressures placed on the Society by its three functions, in many respects it is impressive that a pharmaceutical trade continued at Apothecaries' Hall

for 250 years. This undoubtedly resulted from the Society's determination to continue its role as a guarantor of drug quality and to uphold one of the reasons for its existence. The fact that the Society's trade could survive for so long in a changing pharmaceutical marketplace, even if it did not always flourish, indicates that the standard categorization of firms in the pharmaceutical industry should be expanded. As a supplier of high-quality drugs with a high standard of service, the Society catered for a specialist market for which demand continued even after the Hall trade's closure. Although the Society is a unique institution with trading and manufacturing operations that were very different from those of contemporary, competing pharmaceutical firms, it is fundamental to our understanding of the development of the British pharmaceutical industry.

APPENDIX A

Biographical References for Chemists Employed at Apothecaries' Hall, 1822-1922

Nathaniel Parr Booth (c. 1878-1950)

Journal of the Royal Institute of Chemistry, **74** (1950), p. 275.

The Analyst, **76** (1951) p. 251.

William Thomas Brande (1788-1866)

DNB; *DSB*; *Thoemmes Dictionary.*[1]

Elizabeth Haigh, "William Brande and the chemical education of medical students", in Roger French and Andrew Wear (eds.), *British Medicine in an Age of Reform* (London, 1991), pp. 186-202.

Edward Ironmonger, "Forgotten Worthies of the Royal Institution of Great Britain: William Thomas Brande (1788-1866)", *Proceedings of the Royal Institution*, **38** (1960-1), pp. 450-61.

Edward Ironmonger, "Further Thoughts on W.T. Brande", *Proceedings of the Royal Institution*, **44** (1970), pp. 262-73.

C.H. Spiers, "William Thomas Brande, Leather Expert", *Annals of Science*, **25** (1969), pp. 179-201.

JCS, **19** (1866), pp. 509-11.

Medical Times and Gazette, 17 February 1866, pp. 178-9.

PRS, **16** (1867-8), pp. ii-vi.

[1] Bernard Lightman (ed.), *The Dictionary of Nineteenth Century British Scientists*, Thoemmes Continuum, forthcoming May 2004.

David Brown (1840-1921)

Pharmaceutical Journal, **107** (1921), p. 25.

Proceedings of the Institute of Chemistry, (1921), part IV, p. 264.

Proceedings of the Royal Society of Edinburgh, **41** part II (1920-1), p. 199.

Alfred J. Bull (d. 1950)

Proceedings of the Physical Society of London, (1950), p. 1372.

William Chattaway (1861-1904)

The Analyst, **29** (1904), pp. 329-30.

Chemist and Druggist, **65** (1904), p. 654.

Journal of the Society of Chemical Industry, **23** (1904), p. 1078.

Pharmaceutical Journal, **73** (1904), p. 568.

Proceedings of the Institute of Chemistry, (November 1904), p. 8.

Jules Cofman-Nicoresti (dates unknown)

Chemist and Druggist, **108** (1928), p. 418.

Basil Radcliffe Coysh (1876-1929)

Proceedings of the Institute of Chemistry, (1929), p. 213.

Robert Higgins Davies (1851-93)

The Analyst, **18** (1893), pp. 285-6.

Chemist and Druggist, 2 December 1893, p. 801.

JCS, (1894), pp. 384-5.

Pharmaceutical Journal, **24** (1893), p. 439.

Henry Hennell (d. 1842)

Memoirs of the Chemical Society, **1** (1841-3), p. 52.

PRS, No. 55 (1842), p. 419.

Cresacre George Moor (1868-1954)

The Analyst, **79** (1954), pp. 396-7.

Journal of the Royal Institute of Chemistry, (June 1954), pp. 334-5.

William Partridge (c. 1880-1933)

The Analyst, **59** (1934), pp. 69-70.

Proceedings of the Institute of Chemistry, (1933), p. 386

Frederick Penny (1816-69)

DSB.

A.J. Berry, " Frederick Penny: A Forgotten Worker on Equivalent Weights", *Chemistry and Industry*, **51** (1932), pp. 453-4.

Glasgow Medical Journal, (1870), pp. 258-70.

JCS, **23** (1870) pp. 301-6.

Proceedings of the Philosophical Society of Glasgow, **7** (1870-1), pp. 364-71.

Frederick Farey Shelley (1863-1947)

Proceedings of the Institute of Chemistry, (1947), p. 273.

Alexander Young Stewart (c. 1842-90)

Chemist and Druggist, 22 March 1890, p. 390.

Pharmaceutical Journal, **20** (1889-90), p. 768.

Snow Blagburn Tallantyre (1890-1954)

Journal of the Royal Institute of Chemistry, (January 1955), pp. 48-9.

George Warington (1840-74)

JCS, **27** (1874), pp. 1203-4.

Robert Warington Senior (1807-67)

DNB; Thoemmes Dictionary.

J.H.S. Green, "Robert Warington (1807-67)", *Proceedings of the Chemical Society*, (September 1957), pp. 241-6.

Pharmaceutical Journal, **9** (1868), pp. 493-4.

JCS, **21** (1868), pp. xxxi-xxxiii.

PRS, **16** (1867-8), pp. xlix – l.

Robert Warington Junior (1838-1907)

DNB; DSB.

JCS, **93** (1908), pp. 2258-69.

PRS, **80** (1908), pp. xv-xxiv;

Frederick Wharton (1874-1946)

Proceedings of the Institute of Chemistry, (1946), p. 291.

I have been unable to locate obituaries for Arthur Jones, Thomas Pearmain or Martin Priest.

APPENDIX B

Significant Members of the Society of Apothecaries, 1822-1922

George Corfe (c. 1809-94)

Corfe, Resident Medical Office at the Middlesex Hospital, was involved in the trade's reorganisation in 1880-1. He reported on the Society's finances in 1883 and was Master in 1884-5. He also wrote a short history of the Society in 1885 to highlight its contributions to medical practice.

Edward Browne (d. 1827)

Browne, an apothecary of Raven Row, Spitalfields, was deputy treasurer of the United Stock from 1822-7, having previously held the post in the Laboratory Stock. He was Master of the Society in 1824-5.

Henry Field (1755-1837)

Field, an apothecary from Newgate Street, was apothecary at Christ's Hospital. He made a significant contribution to the Hall trade as deputy treasurer of the Laboratory Stock from 1815-22, deputy treasurer of the United Stock from 1823-7 and treasurer from 1827-37. He also sat on the first Court of Examiners and was Master in 1825-6.

I am grateful to Dee Cook for letting me see her entry on Field for the forthcoming *New Dictionary of National Biography.*

George Hogarth Makins (1815-92)

Makins qualified as a Licentiate of the Society of Apothecaries, but never practised in medicine and instead pursued a career in chemistry. He practised as an assayer and also lectured on metallurgy, although ill-health forced him to retire from the former in 1863. Later in life Makins renewed his association with the Society of Apothecaries. He was elected to the GCM in 1877 and took a specific interest in the trade's reorganisation. He was elected to the Court of Assistants in 1880 and sat on the new Managing Committee until just before his death, with his chemical and business skills helping to guide the trade's new format. He was Master in 1889-90.

Journal of the Society of Chemical Industry, **11** (1892), p. 421.

Proceedings of the Institute of Chemistry, (1892), part II, pp. 20-2.

Sir Shirley Forster Murphy (1848-1923)

Murphy's early career included appointments with the Metropolitan Asylums Board and at the Government Animal Vaccine Establishment in Lambs Conduit Street. He built up a considerable reputation in epidemiology and hygiene and from 1889-1911 was the first Medical Officer of Health for the London County Council. Murphy's expertise was crucial to the Society's work on plague serums and probably also that on vaccines. His standing in the medical community provided the Society with a prominent advocate of its activities. Murphy was involved in all aspects of the trade in its final years. He sat on the Managing Committee from the beginning of 1918 until 1922 and was Master in 1920-1.

BMJ, 5 May 1923, pp. 790-1.

The Lancet, 5 May 1923, pp. 927-9.

Plarr's Lives, 1930, pp. 85-6.

John Nussey (1794-1862)

Nussey, who was based in St James Street, was royal apothecary to George IV and Queen Victoria. He was instrumental in regaining the Navy contract in 1834, holding the office of Master in the same year. He was deputy treasurer of the United Stock from 1838-45 and treasurer from 1846-54. His influence as a royal apothecary assisted the Society in all of its activities and he was its first representative on the General Medical Council.

John T.M. Nussey, "Walker and Nussey – Royal Apothecaries, 1784-1860", *Medical History,* **14** (1970), pp. 81-9.

Jeronimo Simoens (1791-1876)

Although little is known about Simoens, he served on the medical staff in Belgium in 1815. He was Master of the Society in 1857-8, deputy treasurer of the United Stock from 1862-8 and treasurer from 1868-72.

William Simons (d. 1836)

Simons, an apothecary from Soho Square, was the first treasurer of the United Stock, a post he held until 1826. From 1805 he had been Navy Stock treasurer. Master of the Society in 1816-7, he was involved in all of its activities and chaired the first Court of Examiners.

Meredith Townsend (1847-1918)

Townsend practiced medicine in south-west London. He strongly advocated reform of the United Stock in the late 1870s and was also instrumental in commissioning an independent inquiry into the Hall trade in 1914, when he was Master. At the time of his death he was the Society's representative on the General Medical Council.

The Lancet, 16 November 1918, p. 681.

Nathaniel Bagshaw Ward (1791-1868)

Ward was a noted botanist, microscopist and inventor of the Wardian Case. He was elected a Fellow of the Royal Society in 1852. Although his involvement with the Society is frequently overlooked, he was an influential member. He was Master in 1854-5, arranged microscopical conversaziones at Apothecaries' Hall, and was deputy treasurer of the United Stock from 1855-61 and treasurer from 1862-8.

D.E. Allen, *The Victorian Fern Craze* (London, 1969), pp. 10-24.

Gentleman's Magazine, new series **1** (1868), p. 271.

Proceedings of the Royal Society of London, **18** (1869-70), pp. ii-iv.

APPENDIX C

Chemical Operators[1]

Samuel Stringer, 1672-3

Samuel Hull, 1673-5

Nicholas Staphorst, c.1676-c.1701

Francis Condy, c.1685-c.1716

Thomas Field, c.1713-27

Thomas Wilford, 17??-1742

William Randolph, 1742-50

Michael Clark, 1750-c.1781

Stephen Griffin, c.1781-c.1793

Francis Moore, c.1793-1812

Sylvanus Ronalds, 1816-18

Henry Hennell, 1821-42

Robert Warington, 1842-66

George Warington, 1866-68

Alexander Young Stewart, 1868-80

Galenical Operators

Nathaniel Benson,* c.1715-c.1740

James Waugh, occupant of post in 1747

John Friend,* c.1760-84

John Robson,* c.1771-85

Christopher Gregson, 1783-1815

Richard Clarke, 1816-26

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[1] Adapted from details in Whittet, 1977, entries in CM, Laboratory Stock Articles and PHIBB.

* Possible Occupant of Galenical Post

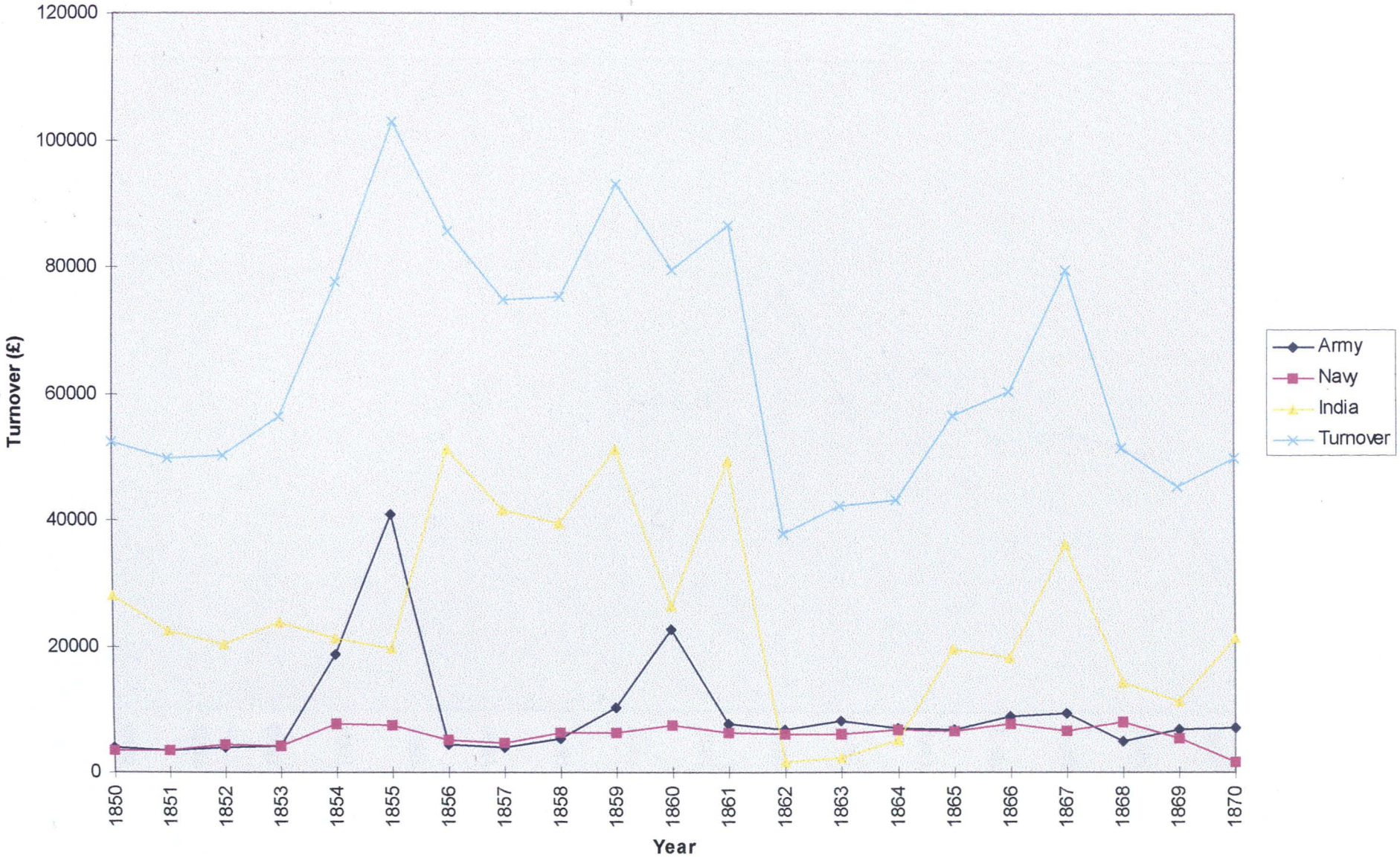
APPENDIX D

Contents

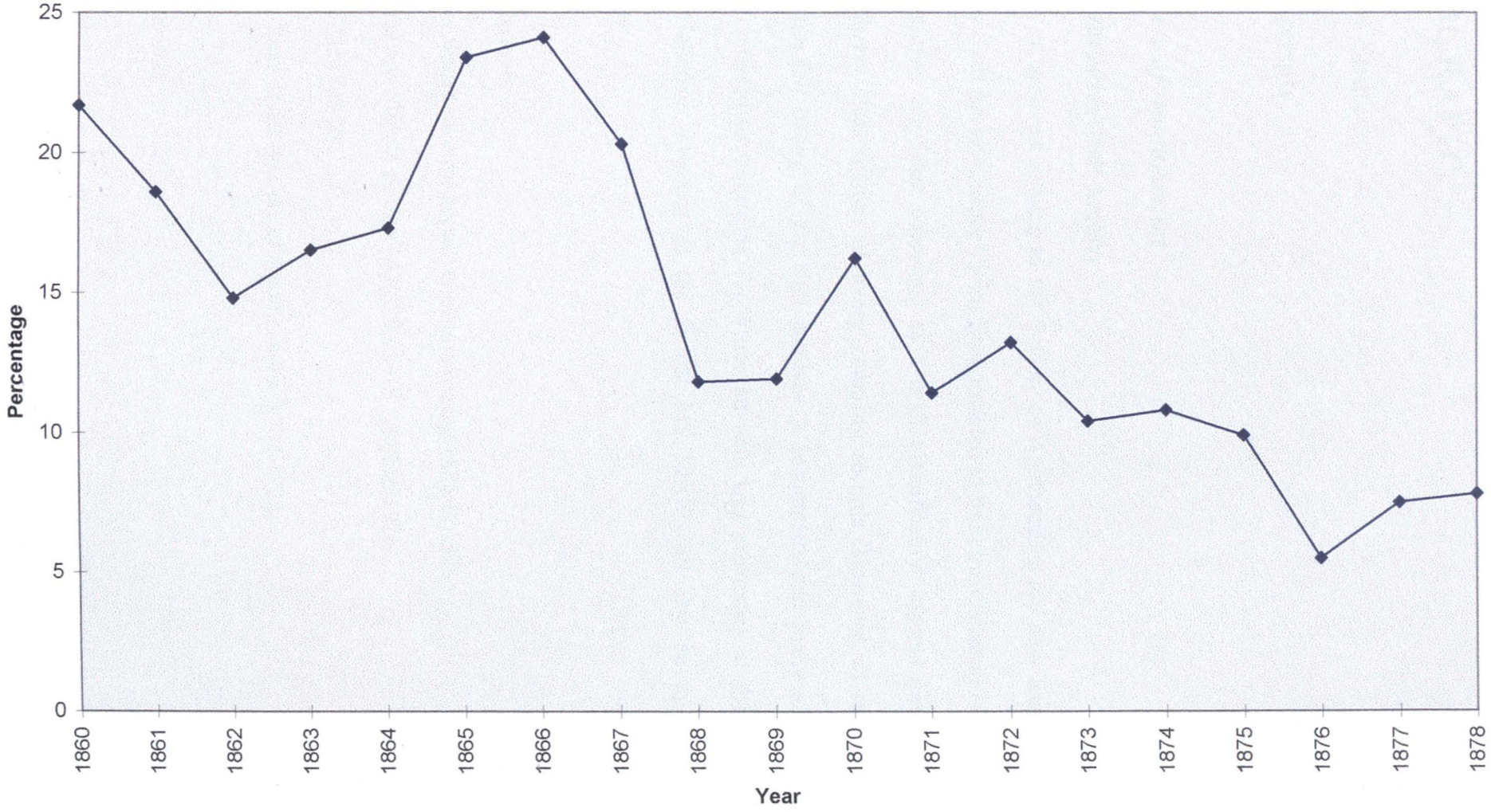
Data for graphs derived from annual dividends announced at March Court of Assistants and USAB vols. 1-4.

Graph A: Dividends Paid to First Class United Stock Proprietors, 1823-1878

Graph B: The Turnover of the Hall Trade, 1850-1870



Graph C: Percentage Profit on Turnover, 1860-1878



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1. Primary Sources

1.1. Manuscripts

1.1.1. Society of Apothecaries

1.1.1.a. Apothecaries' Hall Archive

The majority of archives relating to the Society of Apothecaries are now located at the Apothecaries' Hall Archive, many having been transferred from the Guildhall Library. The Society's archives are listed according to a draft classification scheme based on the Guildhall Library classification of livery company records. However, at the time of submission the full listing of the Hall archives is incomplete and many of the trade archives are referred to simply as T/. Where an item was previously at the Guildhall Library, a Guildhall reference in the format MS 82XX will also be given to aid identification.

Corporate Records

Clerk's Letter Books: twenty-seven volumes covering 1876 to 1925.

Court of Assistants Minute Books: MS 8200/1–18, 1617 to 1926.

Also volume for 1926-38.

Membership Lists of the Society of Apothecaries, 1702-1922.

Financial Records

Box D4

Box D5

Library and Education

Catalogue of the Library of the Society of Apothecaries, 1831.

Library Committee Book, 1832-5.

Notes of William Brande's Lectures by Charles Collambell, 1829-30.

Syllabus of Six Lectures on the Philosophy of Chemistry, 1851, attached to the draft re "A Return by the Master and Wardens of the Society of Apothecaries of the City of London in obedience to a Resolution of the House of Commons dated the 17th day of July 1856 [re Medical Museums, Libraries, Botanic Gardens etc]".

Property

Property Papers and Deeds: MS 8263, 8265, 8269.

Trade Records

Minute Books

Minute Books of the Court and General Meeting of the Proprietors of the United Stock, the special sub-committee of the United Stock and the various committees of managers.

MS 8223 vol. 1 1823-38

2 1838-50

3 1851-67

T/3 Court of Proprietors and General Committee Minute Book, 1867-80.

Management Committee Minutes:

T/24 1881-6

T/25 1887-94

T/26 1894-99

T/27 1899-1902

T/28 1902-04

T/29 1904-08

T/30 1908-11

T/31 1911-14

T/32 1914-18

T/33 1918-21

T/34 1921-2

Accounts

Trade Account Book, 1730-72, MS 8225.

United Stock Account Books:

MS 8224 vol. 1 1812-30

2 1831-46

3 1846-59

4 1860-78

T/2 Laboratory Stock Audit Book, 1803-22, also includes United Stock Audit Book, 1823-57.

T/4 Audit ledger, 1879-81.

T/5 Salaries and Rentals Ledger, 1847-74.

T/6 Proprietors' Dividends Book, 1857-74.

T/7 Proprietors' Dividends Book, 1875-81.

T/8 Trade Account Audit Book, 1858-1911.

T/9 Balance Sheets, 1912-21.

T/10 Ledger 1912-21.

T/11 Private Ledger 1915-21.

Letter Books

T/22 1913-22.

T/23 1914-22.

E: Records of Trade, Craft and Professional Activities

E/2/5/1/2 Letters from Home Office regarding registration of laboratories, 1908.

E/2/5/2/6 Indian Drug Factory Papers.

E/7 Records of the Pharmaceutical Trade:

Loose Papers: Boxes 1 to 6.

Miscellaneous

Building Committee Minutes, 1781-5, MS 8232, vol. 1.

1837-46, MS 8232, vol. 2.

Catalogus Medicamentorum Chymicorum, 1764, 1791.

Deed of Co-partnership of the United Stock, 1822, MS 8217.

Ground Plan of Apothecaries' Hall, 1874.

India Orders, 1827-8, MS 8261.

Laboratory Process Book, 1868-72, MS 8277.

G.H. Makins' Notebook.

G.H. Makins' Autobiography, photocopy.

News Cuttings Book, marked vol. 1919.

"Origin, Progress and Present State of the Various Establishments for conducting chemical processes and other medicinal preparations at Apothecaries' Hall", 1823.

Petty Cash and Sundry Account Book, 1811-21, MS 8210.

Sundry Account and Memoranda Book, 1672- c.1700, MS 8204.

Warden's Cash Book, 1810-16, MS 8209, vol. 2.

1.1.1.b. Guildhall Library Department of Manuscripts

The following were still located here in February 2004:

Laboratory Stock Articles of Agreement, 1713-66, MS 8214.

1774-1822, MS 8216.

Salaries Receipt Book, 1823-46, MS 8259.

1.1.2. Other Archives Consulted

Institute of Arable Crop Research (IACR), Rothamsted, Harpenden

Robert Warington Senior Papers, Section G.

Folder 1, Mathematical and Chemical Society.

Folder 4, Untitled (Notes and Miscellaneous Letters).

Folder 19, Notebook containing experimental notes, marked "Analysis of Water of the River Lea".

Linnean Society

Form of Recommendation for a Fellow of the Linnean Society of London, A.Y. Stewart, 15 February 1877.

Letter, Alexander Stewart to James Murie, 27 October 1881.

London Metropolitan Archives

Metropolitan Asylums Board

Proceedings of Managers: MAB 56, vol. 42, 1908.

MAB 57, vol. 43, 1909.

MAB 58, vol. 44, 1910.

MAB 59, vol. 45, 1911.

MAB 60, vol. 46, 1912.

MAB 63, vol. 49, 1915.

Contract Committee Minutes: MAB 644, vol. 27, 1908.

MAB 646, vol. 29, 1910.

MAB 648, vol. 31, 1912.

MAB 650, vol. 33, 1914-15.

Hospital Committee Minutes: MAB 813, vol. 9, 1908.

Truman Ltd, Brewers

B/THB/F/1, Clerk's Salaries, 1819-45.

British Library

Oriental and India Office Collections

Court of Directors Minutes, East India Company, B/47, 1704.

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L/MAR/C/876, Stores for East India Company's own ships, sloops and hoys – original invoices 1832-4.

Bimonthly returns by the Director General of Stores, India Office.

L/AG/36/1/1 April 1869	/5 February 1873	/9 April 1877
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/3 February 1871	/7 October 1875	/11 June/July 1889
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